National Ignition Facility Quarterly Status Report— First Quarter 2000, Oct–Dec 1999

Lawrence Livermore
National Laboratory

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NIF-0041197
UCRL-ID-137237-00-1

NIF
The National Ignition Facility

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Work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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NATIONAL IGNITION FACILITY
FIRST QUARTER 2000 STATUS REPORT
OCTOBER—DECEMBER 1999

Project Name:	National Ignition Facility	Building No.	581, 681 at LLNL	
DOE Line Item No.:	96 D - 111	**Project Manager:**	E. I. Moses	925-423-9624 925-423-2612 (fax)
Budget & Reporting No.:	39 DP 02 (PACE) DP 0213 (OPC)	**System Engineer:**	M. L. Spaeth	925-424-4940 925-422-4667 (fax)
Funding Source:	Weapons Stockpile Stewardship – ICF	**Program Sponsor:**	C. J. Keane	301-903-4323
Original Funding Year:	’96 (first quarter)	**Construction Manager:**	V. S. Roberts	925-424-3662 925-423-7588 (fax)
Project Summary Description:	The Project provides for the design, procurement, construction, assembly, installation, and acceptance testing of the National Ignition Facility (NIF), an experimental inertial confinement fusion facility intended to achieve controlled thermonuclear fusion in the laboratory by imploding a small capsule containing a mixture of the hydrogen isotopes deuterium and tritium. The NIF will be constructed at the Lawrence Livermore National Laboratory (LLNL), Livermore, California as determined by the Record of Decision made on December 19, 1996, as a part of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM PEIS).			
Project Justification:	The mission of the National Inertial Confinement Fusion (ICF) program is to achieve controlled thermonuclear fusion in the laboratory. This program supports the Department of Energy (DOE) mandate of maintaining nuclear weapons science expertise required for stewardship of the stockpile, testing of nuclear weapons effects, and the development of fusion power by providing a database for inertial fusion ignition. This mission was identified in the NIF Justification of Mission Need, which was endorsed by the Secretary of Energy. Identification of target ignition as the next important step in ICF development for both defense and nondefense applications is consistent with the earlier (1990) recommendation of DOE’s Fusion Policy Advisory Committee, and the National Academy of Sciences Inertial Fusion Review Group. In 1995, the DOE’s Inertial Confinement Fusion Advisory Committee affirmed the program's readiness for ignition experiments. A review by the JASONs in 1996 affirmed the value of the NIF for stockpile stewardship.			
Interfaces with Other Projects	The NIF is a key element of the Stockpile Stewardship Program. It will provide scientific data for secondaries and will complement hydrodynamic tests and material testing for primaries. The NIF will provide data to calibrate ASCI models.			
Risk Management:	The System Engineering group has been organized and chartered to identify and manage risk. Working Groups within this organization include Beampath, Flange to Flange (cleanliness), Alignment, Contamination Control, Laser and Target Area Building (LTAB) lighting, Test Plans, Activation, and SSDR/ ICD Update.			
Execution & Acquisition Strategy:	The model successfully employed to execute the Conventional Facility will be adapted for the Beampath Infrastructure Systems. This model relies on the services of an Architect Engineer (A/E) for design and a Construction Management firm to assist in managing the complex interfaces during installation and the commissioning of construction contracts. The Acquisition Strategy for laser equipment will focus on the use of integrating contractors to the maximum extent possible to achieve the performance specifications and incorporate technology advances.			

FIRST QUARTER (OCTOBER, NOVEMBER, DECEMBER) 2000
PROJECT MANAGER'S PROGRESS REPORT

Summary Status

Category	Last Period	This Period	Projected Next Period
Cost	Major concern	Major concern	Major concern
Schedule	Major concern	Major concern	Major concern
Technical	Satisfactory	Satisfactory	Satisfactory
Overall Project	Major concern	Major concern	Major concern

NIF PROJECT MANAGER'S ASSESSMENT

Overall Project Assessment

Major concern due to schedule and cost .

Safety: The Construction Safety Program was reviewed by the DOE Integrated Safety Management verification team. An independent electrical safety review of the construction site provided its final report and recommendations. DOE conducted quarterly construction safety and fire safety reviews.

Technical Status: The general status of the technologies underlying the NIF Project remains satisfactory. The issues currently being addressed are (1) cleanliness for installation, assembly, and activation of the laser system by Systems Engineering working groups; (2) laser glass, where a second pilot run at both commercial suppliers is expected to confirm the mitigation steps identified in the first pilot run; and (3) operational costs associated with Final Optics Assembly (FOA) optics components, where methods are being developed to mitigate 3ω damage and resolve beam rotation issues.

Schedule: The completion of the Title II design of laser equipment remains 12–18 months behind schedule, and the project completion schedule remains a major concern for the quarter. The Beampath Infrastructure System is on the critical schedule path. The procurement strategy is being evaluated by commercial A/E contractors with a report presented to a panel of independent experts, the Beampath Infrastructure

System Implementation Review Committee Advisory Group. At the end of December, this advisory group provided its final report and recommendations.

The construction status of the Conventional Facilities at the end of November is 82.9% complete and is projected to finish within budget and on schedule.

Cost: The NIF Project Total Project Cost (TPC) is $1.2B. The Project has obligated 72% of the TPC funds. The remaining contingency is $24M. Because of schedule delays and projected increases in the design, construction management, assembly, and installation of the system infrastructure, cost growth of the TPC is anticipated and will remain a major concern until the budget rebaseline process is completed.

First Quarter Rebaseline Activities

The NIF Laboratory Project performed the following key actions in the first quarter to rebaseline the Project before June 1, 2000: (1) submitted the Rebaseline Plan input; (2) aligned Level 3 Baseline Change Control Board and Level 4 Change Control Board memberships consistent with the new organization; (3) made significant progress on the rebaseline schedule that forms the basis for the rebaseline cost estimates; (4) implemented contractor activities to bring in industry to design, fabricate, and assemble the Beampath Infrastructure systems; (5) presented the program and plan for Beampath Infrastructure System Implementation to the Independent Review Committee; (6) provided DOE a status report on all major LLNL Project actions in the Secretary's 6-point Plan; and (7) continued the major external independent external reviews of the Project.

Rebaseline Planning: The Rebaseline Plan lays out the integrated activities to achieve new procurement strategies to involve industrial partners in the Beampath Infrastructure and the use of contractors to design, manufacture, and assemble laser systems using enforceable bid documents, as is currently done in the Conventional Facilities. The Rebaseline Plan was submitted to the DOE on November 15, 1999. Two potential completion options were also submitted to DOE, and the option currently being rebaselined is Option IA.

Management Organization: The organization to effectively implement the rebaseline of NIF was aligned with the Project Functional System Description. The organization was formally announced at a Project meeting in November 1999.

Schedule Rebaseline: Inputs to the rebaseline schedule for the first of two completion options have been put into the Primavera System. Logic and consistency reviews are being performed along with reviews of consistency with budget profiles. This rebaseline schedule forms the bottom-up basis for other completion options and also serves as the basis for the time-phased cost estimate of the NIF completion costs.

Procurement Strategy: LLNL is reviewing the Beampath Infrastructure Systems to determine the optimum method of involving industry in the design, construction, installation, and commissioning of the infrastructure systems. There was a December 15, 1999 review with the Beampath Infrastructure System Implementation Review Committee Advisory Group. The Advisory Group presented their review and recommendations in a report.

Independent Reviews: The reviews by the Univeristy of California (UC) President's Panel, the General Accounting Office (GAO), and Secretary of Energy Advisory Board (SEAB) of independent experts to advise on go-forward deployment strategies and engineering issues are ongoing.

First Quarter Activities Highlights

Site and Conventional Facilities: Installation of structural steel for new Preamplifier Module Maintenance Area (PAMMA) clean room was completed.

Laser/Optics Systems: Major contract awards were made for the Preamplifier Beam Transport System PABTS breadboards and amplifier enclosure top plates and upper plenum. The Spatial Filter Vessel fabrication vendors continue to be behind schedule, but are not on, nor expected be be on, the critical path.

Beam Transport Systems: The restructuring and completion of work packages continues to be the critical path activity for the Project. The proposed plan for implementation was presented to the Beampath Infrastructure System Implementation Review Committee Advisory Board.

Optics: Half of the conventional crystal growth runs have been planted at the vendor, bringing the total to five for deuterated potassium dihydrogen phosphate (DKDP). Rapid-growth production contracts were signed with both vendors.

Target Experimental System: Target chamber vacuum leak testing continues, and guniting for radiation shielding is on schedule. A problem identified is the rotation of the laser beam in the final optic assembly (FOA). Design solutions are being studied. This will result in cost and schedule impact, but solutions to beam rotation may improve the previously identified 3ω damage problem in the FOAs.

Operations Special Equipment: The spatial filter insertion systems procurement package was awarded.

ES&H and Supporting R&D: A total of 1569 long-edge cladding strips and 1656 short cladding strip slab equivalents have been produced at one vendor. The other vendor continues to produce excellent quality and yields of edge cladding glass.

Second Quarter Scheduled Activities

The major activities scheduled to occur in the second quarter are to (1) review the SEAB Task Force initial report, (2) conduct three video confer-

ences on rebaseline cost estimates and schedule with DOE HQ, (3) present the Baseline Infrastructure System procurement strategy and Beampath Infrastructure System Independent Review Committee report to DOE, (4) award the contract for the Construction Manager/General Contractor for the Beampath Infrastructure System, (5) complete OAB facility turnover to Operations, (6) submit rebaseline schedule to DOE for Option IA, (7) complete Switchyard steel space frames in Switchyard #2, (8) continue GAO interviews, (9) submit the procurement strategy for Beampath Infrastructure System to DOE, (10) support Draft Supplemental Environmental Impact Statement public meetings, and (11) have independent cost validation team fully on board.

WBS 1.1 PROJECT OFFICE

ACTIVITIES

Project Office

The major Project Office activities were to: (1) develop NIF Rebaseline Plan input for DOE, (2) prepare the rebaseline schedule and cost estimates based on the go-forward options, (3) participate in external reviews by U.C., SEAB, and GAO, and (4) provide weekly, monthly, and quarterly status reports.

The input to the NIF Rebaseline Plan, along with the definition of the proposed go-forward options, was submitted to the DOE. Option IA was selected as the first to implement. The first major action is to develop the procurement methodology strategy for the Beampath Infrastructure Systems (see WBS 1.4) and to prepare the rebaseline schedule and cost estimate for the options selected by the DOE. Under the Manager of Schedule and Budget Planning, a focussed effort was placed on schedule preparation. A review of consistency and completeness in inputs is in progress. The inputs to the new cost estimates have been made by the Systems Managers, and consistency reviews are also beginning.

The report on major LLNL Project actions for the Secretary's 6-point Plan was submitted on December 7, 1999.

Several external reviews occurred in November: (1) University of California President's Office review of management and the causes of cost/schedule overrun was completed and the report issued; (2) GAO review of the NIF continued with individual interviews; and (3) SEAB Task Group of independent industry and scientific experts to advise on NIF procurement and engineering strategies conducted two meetings in November, receiving briefings from DOE and the LLNL Project Office.

Assurances

Provided the FY2000 schedule for Assurance audit and surveillance

System Integration

System Engineering made presentations to the SEAB Task Group on system engineering requirements for the NIF and cleanliness.

The Level 3 Baseline Change Control Board and Level 4 Change Control Board actions are found in the following tables:

Level 4 Change Control Board Actions:

ECR	Title	Resolution	Cost
346	Target Area Utilities Helium Pipe Reduction	APPROVED	0K
465	Unconverted Light Management Using Color Separation Grating	DISAPPROVED	0K
545	Target Chamber Vacuum Specifications	APPROVED	0K
865	TSF One Omega Pick-Off	DISAPPROVED	0K
1072	Manport Cover O-Ring	APPROVED	26.8K
1120	Docking Plate Chamber for Universal Canister	APPROVED	96K
1172	PCS Development Strategy Change	APPROVED	0K
1254	Beam Tube SF4, Circular	DISAPPROVED	0K
1275	Adopt Wedged Lens for FOA and Start Redesign of Transport Section	APPROVED	500K
1282	Make LB Pedestal Finish Wipe-able	APPROVED	90K

Level 3 Baseline Change Control Board Actions:

BCP	Title	Resolution	Date	Cost
002	Scope Increase – AE Title III Engineering	APPROVED	10/18/99	752K
005	Capacitor Procurement (Return to Contingency)	APPROVED	11/18/99	-1812K
007	Add Shrapnel Shielding to Capacitor Bay Walls	APPROVED	11/18/99	1300K
008	Amplifier Top Plate	APPROVED	11/18/99	846K
009	Amplifier Upper manifold	APPROVED	11/18/99	2389K
010	Funding of Jacobs Engineering to Develop Requirements for P&IDs	APPROVED	12/20/99	800K

The current contingency log is attached.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Waiting for DOE approval or comment of the revised QA Program Plan that includes the Integrated Safety Management program.

PROCUREMENTS

The Cost Estimating Team from MTA (SAIC) placed.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

(1) Review SEAB draft report, (2) receive the DOE feedback on the November 1999 Monthly Status Report, (3) complete the integrated schedule (for Option IA), (4) provide three video conferences on the status of cost and schedule rebaselining, (5) brief DOE on the procurement strategy and methodology on Beampath Infrastructure System Implementation, and (6) continue to support external reviews—GAO and SEAB Task Group.

WBS 1.2 Site and Conventional Facilities

Activities

NIF Experimental Buildings

Conventional Facilities work reached 82.9% completion in December, compared with 78% at the end of September. To date, $173.1M in construction contracts has been placed for the NIF Conventional Facilities construction, and work in place is approximately $142.2M. Additional scope was added to Conventional Facilities for the PAMMA and Master Oscillator Room (MOR) clean-room build-out and the relocation of site utilities to avoid precluding a second target chamber.

Measurable progress on the Laser Building (LB)/Site Work, the Target Building (TB), the Diagnostics Building, and the Optics Assembly Building (OAB) continued in December.

The Laser Bay 2 concrete pedestal surveying, rough finishing, and final clean-up work was completed and made ready for finish painting. The scaffolding for the resumption of overhead finishes near line 10 was installed, and fireproofing and framing continued in this area. In Laser Bay 1, the concrete pedestal work was completed in December. The installation of structural steel for the new PAMMA clean room was completed.

Within the Target Building, concrete was placed for the 50.50 radial raker walls/beams and inner ring beam. Concrete was placed for the inner ring of the 69.75 slab. The SY2 roof had concrete placed in three (3) separate pours (one week apart each) to insure minimal loading and maximum curing over the precast beams. PDM completed the first layer of gunite and installed the second layer of rebar on the Target Chamber. In addition, the installation of structural pipe supports, structural frames for mechanical chase openings, and electrical raceways continued at Target Bay levels –21.75 and –3.50. The installation of steel for the upper levels of the SY2 spaceframe continued along with intermediate steel framing.

The Diagnostics Building exterior siding was completed to the 50.50 level on the South walls. Siding installation continued on the West and North walls. Handrail was completed for stairs 13, 14, 15 and 16 with minor outstanding punchlist items. Mechanical installations were 90% complete at level –33.75. Fireproofing was completed for the 17.50 and 29.50 levels. Installation of metal stud walls continued at levels –3.50 and 17.50.

Within the OAB, the final punchlist work continued, including the replacement of damaged UPLA filters, door operator adjustments, and raised floor rework. Substantial completion had been attained and partial beneficial occupancy was taken by the Special Equipment Group for the installation of programmatic equipment and utilities.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Congestion on the west side of the site will continue to be the major burden through the winter. Four contractors are installing work in the same vicinity. Maintaining access to the building for workers and materials, at the same time as underground utilities are being installed to meet completion dates this winter, continues to require a great deal of coordination.

Site preparation for wet weather construction needs to continue in January to allow for safe and efficient work to occur this winter. Efforts to enclose the building and winterize the site, including the sealing of roof openings at the OAB corridor and the LB-TB and Switchyard (SY) interfaces, will continue to be a challenge.

Pitt-Des Moine's (PDM's) duration within the Target Bay may impact Nielsen-Dillingham Builders Inc.'s ability to meet the milestone of having the Target Building commissioned and turned over to Special Equipment by July 31, 2000.

The current location of the ringer crane and Rigging International's request to use the crane beyond January 31, 2000, may impact Construction Subcontract Package (CSP)-9's completion date for electrical/communication utilities outside SY1. This in turn could affect the date for permanent power to SY2.

PROCUREMENTS

None planned.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

The milestone OAB Complete (Cleaned and Commissioned), CF555221, originally planned for August 1999 and projected for December, has been delayed due to final punchlist items closeout. Current projections for the OAB, CSP 5, are to complete punchlist items and receive and approve final submittals in February. Completion of commissioning and beneficial occupancy is projected for early March. However, this is not delaying initiation of special equipment installation.

Other upcoming major activities are to complete SY2 roofing and insulation work, begin SY1 steel erection, complete 2 of 7 levels of Target Bay final build out, and continue Laser Bay 1 and 2 drywall hanging and build out.

WBS 1.3 LASER SYSTEMS

ACTIVITIES

Optical Pulse Generation System

Measurements in the MOR integrated test facility have confirmed that the distributed feedback (DFB) fiber laser, manufactured by Ionas, meets performance requirements for output power and stability. The first electro-optic gate chassis (with square pulse and shaped pulse driver chassis) were completed and deployed in the MOR systems test facility.

Preparation of the documentation for the Pre-Amplifier Module (PAM) first-article procurement package continued; an internal review of the procurement package is scheduled for January 6–7. Tests on the new power conditioning unit (PCU) for the PAM were successfully completed at Maxwell. Delivery of the PCU is expected in early February. One of the five Hamamatsu diode arrays for the regenerative amplifier has been tested for power, wavelength, and divergence; it met all specifications.

Amplifier System

Preparations for assembling the first amplifier enclosure in Building 381 are well underway. The facility modifications were completed, and the installation of the support structures for the Frame Assembly Unit (FAU) buses was completed. The structures will be load-tested in January, followed by a "dirty" practice assembly prior to assembling the first bus beginning in the Spring.

Amplifier Power Conditioning System

A final design review was held in December to examine the proposed modifications to the Power Conditioning System (PCS) module to allow off-site assembly, full-power testing, and transportation without disassembly. This change will allow PCS module assembly and test to occur at the integrating contractor site (i.e., in parallel with infrastructure installation activities in the NIF capacitor bays).

A CBD advertisement to identify potential PCS integrating contractors was issued in December. A PCS procurement team is visiting vendors who responded to evaluate their capabilities.

The PCS switch misfire problem that was observed during prototype testing at Sandia was resolved during the past quarter. The cause of the problem was a leak in the gas spark gap; a sealed version of the device will be used in the NIF to eliminate this failure mode.

The Level 3 Change Control Board (CCB) approved a proposal to add shrapnel shielding to the interior walls of the capacitor bays. This change, in conjunction with a redesigned capacitor module enclosure, provides adequate assurance that capacitor bank faults pose no threat to personnel outside the capacitor bays. The bays are unoccupied during capacitor bank charging. Parsons engineers are designing the shrapnel barrier to

LLNL specifications, and building modifications will be completed prior to beneficial occupancy.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Nonvolatile residue and particle-generation tests have been completed on a full-scale amplifier FAU casting. The results indicated that concern about residue trapped in casting pores is not an issue: cast surfaces do not pose an elevated contamination threat to amplifier or other optics. Test results completed in November and December indicated that the castings pose no additional contamination threat compared with other metal parts. Plans to eliminate porosity in the FAU castings using a hot-isostatic-press (HIP) are on hold indefinitely. The engineering team has completed its evaluation and is writing a final report for concurrence by Systems Engineering. This will continue to be reported as a problem until concurrence is obtained.

PROCUREMENTS

The contract for manufacture of the PABTS breadboards was awarded to Kinetic Systems Inc. These breadboards will be built to LLNL prints and supplied as government-furnished equipment (GFE) for CSP-13. The first-article breadboard is expected to be delivered in January. The value of this contract is approximately $1.5M.

A procurement review for the breadboard mounting hardware, which is also GFE hardware for CSP-13, was completed, the request for quotation sent out, and the contract was awarded. The remaining PABTS hardware needed for CSP-13 was also awarded. All components are on schedule for delivery beginning in March as required by the CSP-13 manager.

A review for the procurement of large-aperture Faraday rotators for the PAM and PABTS was conducted. The intent is to award two first articles with binding bids on production quantities, based on a best-value evaluation. All of the procurement package documentation was completed, and the request for proposal (RFP) was sent out. Bids are due February 2.

Early in the first quarter, contracts were awarded for flashlamps (EG&G totaling $7.2M) and capacitors (two vendors, ICAR and Maxwell, totaling $9.2M). This capacitor contract resulted in a return to contingency of $1.8M. The committed quantities were for 96 beams.

Procurement packages were completed for the amplifier end-isolator assemblies and for the kinematic mounts for the Pockels Cell line-replaceable units (LRUs); this hardware is to be installed according to the Beampath Infrastructure strategy.

Fabrication contracts were awarded to Everson Electric for amplifier enclosure top-plates ($2.7M) and upper plenums, aka Big-Ts, ($4.3M). An engineering team had started to develop an alternate, potentially less expensive design. The result of this effort was a revised and significantly

lower cost proposal from the offeror. A contingency transaction request was made and approved by CCB3. This problem, reported last month, is now resolved.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

(1) Continue cost estimating, detail budget planning, development of CAPs, and overall project rebaseline planning; (2) send PAM first-article contract out to bid; (3) make the FAU bus assembly area an active assembly area during the next quarter; (4) conduct vendor evaluations for the PCS first-article and production contract; and (5) prepare RFP for first articles.

WBS 1.4 BEAM TRANSPORT SYSTEMS

ACTIVITIES

Spatial Filter Vessels / Enclosures

The clean installation strategy for clean construction protocol and connection of beam enclosures developed by the Flange Working Group was incorporated into the CSP documents. This strategy was discussed in viewgraph presentations at the SEAB reviews.

Spatial Filters: End vessel fabrications continued with delivery of the first 13 end vessels complete. One Cavity Spatial Filter (CSF) center vessel and two Transport Spatial Filter (TSF) center vessels have been received. Vessel deliveries continued to slip from all three vessel vendors during this quarter. Final deliveries on the end and TSF center vessels are expected in March 2000. Currently, 160 of 240 circular beam tube assemblies are being received, and delivery completion is expected in February 2000. The first rectangular assemblies were received in October and regular, but slow, deliveries have continued.

The CSP-13 TSF and CSF assembly and installation drawings were finalized to support the bid package and are being revised to incorporate 65% package review comments.

Laser Bay Interstage Enclosures (LBIE): For the CSP-16 package, seven LBIE installation drawings and specifications were reviewed at 65% and final drawings are being developed to support the final approval process. A Procurement Review for the LBIEs was delayed to January due to design changes. Technical issues with the fabrication of the first-article interstage docking frame (ISDF) were evaluated and resolved with Engineering Change Requests (ECRs) and deviation requests. The first two SF3 ISDFs successfully satisfied dimensional, leak check, and gross cleaning requirements and were shipped at the end of December. Two more are expected in early February, and the balance of 12 are expected before June 1. The rupture panel GFE specification and reference drawing were completed, and four fabricators were contacted for a verification estimate.

After discussions with the Value Engineering group, a decision was made to proceed with the current gas seal flange design and a silicone P-gasket design for the LBIE, SY, and Target Area enclosures. Procurement and QA organizations are actively qualifying vendors to fabricate and clean the gasket material per required Mechanical Engineering Letter (MEL) specifications.

Switchyard (SY) Enclosures: Yuba City Steel Products Co. began fabrication of the straight enclosures. Redesign of the enclosure elbows to accommodate a bellows on the 45^{o} face is planned for review and release

to bid in early February. The specification and Request for Quotation (RFQ) for the first-article bellows assembly (covering LB, SY, and TB bellows) are planned for completion in January. The vendor interaction, fabrication, and testing of these first articles is required to move the remaining bellows designs forward to meet all design and project requirements.

Assembly and installation drawings required for 65% review of CSP-19 were completed. Work continues for the CSP-19 100% package, including constructability analysis to determine the best sequence for installing the beam enclosures, the precision diagnostics, and the utilities in the Switchyards.

Ghost Mitigation: Design of the Ghost Mitigation hardware was completed. An RFQ package for the remaining beam tube 'megaphone-style' ghost mitigation hardware is expected to be issued in January. Installation of the spatial filter ghost mitigation towers has been added to the scope of CSP-16.

Roving Mirror Diagnostic Enclosure (RMDE), Optic Mounts, and Gate Valve: The RMDE installation has moved from CSP-16 into CSP-19 and the drawings and specifications were incorporated into the CSP-19 65% review package. These installation drawings and specifications were updated to incorporate the enclosures passing through the LB/SY concrete wall.

Roving Mirror optic mount stability analyses continued. Analyses are not final since the LRU (part of the Roving Mirror Assembly [RMA] system) design and properties are not yet available to incorporate into a complete evaluation. Analyses are also being conducted to verify the preliminary stability performance of an alternate mounting structure design. The alternate design, by virtue of the fabrication techniques involved, may result in significant cost savings. The evolving RMA and LRU design may impose minor design changes to the KMS interface design.

Design review comments are being incorporated into the Gate Valve design. Additional design effort addresses features to meet the complete design requirements including manufacturability, installation, and usage mode issues. ECR 1119 incorporates a beam block function into the Gate Valve along with remote operation capability. NIF Operations continues to research the specific beam blocking feature design desired.

Subassembly and Preparations of Government Furnished Equipment (GFE): Performance of CSP-12 preinstallation work continued on spatial filter vessels in preparation for precision cleaning. Eight end vessels were aligned, surveyed, and precision cleaned. The first four vessels were resurveyed following cleaning as a verification of the kinematic locator alignment process. Issues related to passivation of free-iron particles on interior surfaces and verification of final cleanliness levels have been

addressed by phosphoric acid treatment. Due to the continued slips in delivery of the remaining end vessels, efforts were shifted to cleaning circular beam tubes through mid-December when end vessels again became available.

Auxiliary Subsystems

Laser Bay Utilities and Beampath Construction Package: Work continued on the new strategy for completion of LTAB utility systems. The principal effort in this area involved the development of scope and deliverable responsibilities for Parsons. Work continued on completion and checking of industrial controls wiring diagrams and rack layout drawings, correction of the cable schedule, instrument list, and wiring diagrams. To efficiently route and land the LRU cables, simplified representations of the LRU models are being generated by the Integration Group/LRU owners and inserted into the Intergraph 3D model. This will allow the A/E firm to develop the required electrical plans & details directly from their Intergraph system. The requirements review of LTAB utilities by System Engineering and Jacobs Engineering did not identify major design issues, although the controls for amplifier cooling, argon, and vacuum systems will be reevaluated. Changes to these systems identified by the review process will be incorporated into the piping and instrumentation diagrams before design activities on these systems are restarted. Combination of CSP-14 with CSP-18 is being evaluated because, with the delayed release of CSP-14, it will be advantageous to recombine them into one bid package. Progress continued for the beampath installation packages CSP-13, 16, and 19. For CSP-13, 100% design documentation was completed, the package was issued for review, and validated comments were incorporated into the package. The package was reorganized for clarity and bidability. An IWS (Integrated Work Sheet) was generated to define the potential CSP hazards. For CSP-16, the 65% design documentation was completed, the package was issued for review, and comment validation was initiated. The design documentation progressed on schedule. For CSP-19, the 65% design documentation was completed, the package was issued for review, and comment validation was initiated. The design documentation progressed on schedule.

Support Structures

Switchyard Structures: The main structure for SY2 has been installed. The SY1 and SY2 Pro-E models are being updated to reflect the incorporation of Requests for Information (RFIs) and fabrication changes. Parsons continues to receive updates to correctly locate utilities and equipment for the CSPs. SY1 fabrication is proceeding at Coast-AGRA. Approximately 1200 shop drawings have been received and reviewed. There have been far fewer RFIs for SY1 than for SY2, due to lessons learned on SY2, a much better shop drawing subcontractor, and a more complete design package.

Laser Bay Structures: Concrete placement is complete for all of the LB 1 and 2 concrete pedestals. Embedded plates have been surveyed by the

contractor. Results of this survey are under evaluation. An ECR has been approved for the concrete pedestals to be surface finished with a gypsum material prior to painting.

The first three periscope cluster units and parts of the fourth have been received from Martinez & Turek. The fourth periscope cluster unit is expected to be complete in January.

Process Equipment Corporation, the periscope bottom enclosure plate contractor, submitted schedule and heat treatment documents for LLNL approval. Changes to the bottom enclosure plates for the LM2 and Plasma Electrode Pockels Cell (PEPC) have been requested by Transport and Handling. The drawings were completed by mid-December and direction was given to Process Equipment Corporation to proceed. At the present time this change does not effect the construction schedule.

All four LM1 Units have been received from Olympic Tool. ATT Metrology's survey of the location of the kinematic mount sleeves and other machined areas in the LM1 support structures at Olympic Tool revealed that many of the sleeves and other machined holes are not located within tolerance. Unit 4 was shipped in mid-December prior to being accepted. This unit has not been formally accepted, and the issues continue to be worked with the vendor.

Hogan Manufacturing is working on the change order for the fabrication of the Injection Laser System (ILS) Modifications to the preamplifier support structure (PASS). Twelve modules have been delivered. The remaining 36 are scheduled for staggered delivery to be completed by mid-February. This is on schedule.

Optical Mounts

Optical Mounts: The milestone, LRU Assembly Verification System (LAVS) Installed in OAB, OM4440026, originally planned for August 1999, was completed in November 1999.

Problems / Impacts / Corrective Actions

All three Spatial Filter Vessel fabricators continued to slip their schedules, and delivery of the final units are expected to be delayed until March 2000. The fabricator for TSF center vessels (STADCO) experienced difficulties correcting out-of-tolerance features. Frequent vendor visits continue, and submittal of detailed inspection results and corrective action planning is in progress. The delay is not expected to impact construction installation progress, but may require additional manpower to perform vessel hardware installations and cleaning in the next quarter. The delay has impacted precision cleaning activities and required continuation of spatial filter beam tube enclosures cleaning for longer than expected.

RMA interface changes are impacting the RMDE design. Key aspects of RMA design, construction requirements, and installation affecting the RMDE need to be completed and incorporated into CSP-19.

There is an ongoing review of the aluminum flame sprayed surfaces of both the periscope and the LM1. The aluminum surface is quite porous, and high-pressure washing of these surfaces continues to dislodge aluminum particles even after repeated washings. Further, rust blooms have appeared through the aluminum coatings. Work with numerous vendors on alternate surface coatings and correction approaches continues. Systems Engineering issued a memorandum (NIF-39493) addressing the surface requirements for the final interior surface of these units. A correction technique should be selected, and an ECR presented to the CCB in January. Depending on schedule response from the vendors, removal and replacement of the aluminum coating may require resequencing of the CSP-13 activities to minimize schedule impacts on the installation.

The first spatial filter end vessel showed signs of free-iron contamination after gross cleaning. The concern was the evolution of loose rust on the interior beamline surfaces over the life of the vessel that could migrate and damage optics. Consultation with LLNL and off-site corrosion experts indicated that surface contamination of stainless steel during fabrication is a frequent occurrence in shops that work with both mild steel and stainless steel. The consultants recommend that stainless steel parts produced under these conditions have a surface acid etch, similar to that described in ASTM A380 performed prior to precision cleaning. Identification of beamline components and LRUs effected by this problem is underway to support an ECR for funding to perform the required surface treatment. The ECR is expected to be presented to the CCB in January.

Two ECRs were prepared for 1ω diagnostic pick-off modifications to the TSF4 connecting tubes (ECR 865) and the SF4 circular beam tubes (ECR 1254). When reviewed by the CCB in early December, an alternate optical solution was believed to be available that would not require beam tube modifications. In late December it appeared that such a solution might not be workable and that it may be necessary to resubmit these ECRs and proceed with the modifications. Resolution on whether to resubmit is expected by the end of January.

See beam rotation problem described in WBS 1.8. Approval of optical design change (i.e., wedged lens) and associated requirements/specifications changes are needed for engineering activity to proceed for LM6-8 structure-mounted hardware and LRU designs.

Modifying the Parsons contract for completion of LTAB utilities and engineering support to beampath hardware installation packages is a key schedule driver. Discussions to reduce costs and reach closure on scope and resource requirements are underway.

PROCUREMENTS

During the month of October, a procurement was placed with Martinez and Turek for fabrication of SF End Vessel Blank-off Plates for a value of $275K.

During the month of November, a procurement was placed with Yuba City Steel Products for fabrication of the Switchyard Straight Beam Enclosures for a value of $1640K.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule. The FY99 milestone, LRU Assembly Verification System (LAVS) Installed in OAB, OM4440026, originally planned for August 1999, was completed in November 1999. The FY99 milestone, Start Installation of OAB Equipment, OE93100280, replanned for December 1999, was achieved early in November 1999.

UPCOMING MAJOR ACTIVITIES

(1) Continue work for completion of Title II GFE and CSP designs and place orders for most of the remaining Beam Path Systems GFE under this WBS; (2) continue deliveries and construction of vessels, structures, and beam tubes; (3) start GFE preparation activities to complete the SF end and center vessel assembly and cleaning; (4) install SF Tower Support Table kinematic actuators to support construction; (5) place Parsons design completion contract; (6) issue CSP-13 for bid in January and then support the procurement process; and (7) for CSP-16 and 19, complete incorporation of the 65% Design Review comments, complete design to issue for the 100% design review, validate and incorporate comments, and prepare to issue for bid.

Expect to Release for Bid the following items in the next quarter:

1. TSF/CSF KM Bellows with an estimated value of $200K.
2. TSF Extension/Injection Tubes with an estimated value of $300K.
3. Switchyard Elbows with an estimated value of $350K.
4. Ghost Mitigation Hardware for beam tubes with an estimated value of $350K.
5. Ghost Mitigation Hardware for SF vessels with an estimated value of $500K.
6. Laser Bay Interstage Enclosures with an estimated value of $600K.
   LM1/Periscope coating replacement with an estimated value >$1000K (contingent upon ECR approval).

WBS 1.5 INTEGRATED COMPUTER CONTROL

ACTIVITIES

Computer System

Flashlight Software Release: The third release of control system software, named Flashlight, has been delivered in two portions, one into the B481 control system testbed and the other into the B391 alignment laboratory. A demonstration of the Flashlight software for Project managers and engineers was held December 17, 1999. Note that Flashlight was preceded by Nightlight (late 1998) and Penlight (April 1999). Flashlight software and front-end processors (FEPs) operate a variety of distributed control points that demonstrate both vertical integration (from embedded controllers through FEPs to supervisors and graphic user interfaces) and horizontal integration (between eight FEPs, three supervisors, and the distributed frameworks that provide system-wide services).

In the alignment laboratory portion, emphasis was on the automatic processing of control loops (both pointing and centering) that utilize the first-article input sensor package. Images from the input sensor TV camera are digitized by a video FEP and retrieved over the network by the automatic alignment FEP, which performs image processing to determine corrective adjustments. Motor controllers within the alignment FEP adjust beampath mirrors.

In the control system testbed portion, FEPs for timing, preamplifier, master oscillator, video, laser power diagnostics, and laser energy diagnostics were delivered in fully integrated configurations. Both broad-view and maintenance graphical user interfaces were supplied to monitor and command control points.

Software Production Metrics: Flashlight software was inventoried by counting the total source lines of code, exclusive of comments. The inventory has approximately doubled since the previous release of 147,000 source lines, and is now composed of about 330,000 source lines. Supervisory software is now estimated to be 19% complete and front-end processor software 32% complete.

Engineers wrote 168,000 of the total lines of code, which is composed of 131,000 lines of Ada, 25,000 lines of Java, and 12,000 lines of C code. The balance of 162,000 source lines were automatically generated by computer-assisted tools such as the CORBA interface compiler, which produced about 90,000 source lines of Ada directly from specifications.

System Engineering: The NIF software requirements format was modified to reorganize requirements in a tabular format that will assist in the development of test procedures. The new format will initially be used as FEP

requirements are updated to account for revisions to the equipment design.

Supervisory Control Software

Controls Testing: In addition to completing the Flashlight test procedures, the testing group developed schedule and budget planning for supporting the infrastructure control system test activities (e.g., spatial filter vacuum and amplifier gas cooling) and initiated discussions to determine the division of responsibilities between the testing group and Bridgers & Paxton, a commissioning consultant. Tools for test automation were studied, and one was selected for a pilot study during the next quarter. The principal goal is to substantially reduce the manpower needed for regression testing of software updates and incremental hardware installation.

Integrated Timing System

Timing System: As part of a continuing collaboration, engineers from the French CEA visited in November 1999 to discuss the development status of the LIL trigger hardware. They demonstrated French-designed delay generators that are similar in concept to the NIF delay generator but fall short of satisfying NIF performance requirements. In their current configuration, these units are also incompatible with the NIF timing transmitter and control software. However, the demonstration indicates a potential second source for NIF timing hardware.

Integrated Safety System

Integrated Safety System: A constructability review of the safety system cables was completed. Several minor changes that were recommended have been implemented to simplify construction. Revision of safety system drawings (~1000 sheets) is currently about 90% complete and on track for completion in mid January 2000.

A planning exercise to define scope and NIF deliverables was completed to enable Parsons Engineering to complete the facility design. The schedule for submitting deliverables to Parsons will be developed in January 2000.

Problems / Impacts / Corrective Actions

The NIF rebaseline process now underway may determine a software development profile greater than the current staff can support, depending on resolution of the Project milestone dates. In the most aggressive scenario under consideration, the team is projected to be about 20% understaffed. However, there is sufficient time in the schedule for locating and training the additional personnel. Management is considering ways to flatten the required labor profile by selectively deferring some of the functionality now scheduled for first-bundle deployment to be incrementally installed with subsequent bundles.

Procurements

Timing Measurement System: Timing Solutions completed assembly of the sixteen-channel measurement system. System testing performed by

the vendor determined a measurement resolution of 0.1 picosecond with short-term stability measured to be better than 1 picosecond RMS over 4 hours, which exceeds NIF specifications by a factor of 20. A long-term test of 13 channels over 8 days also exceeds specifications. Peak-to-peak deviations of round-trip delay ranged from a minimum of 3.5 ps to 8.6 ps with standard deviations ranging from 0.4 to 1.3 ps.

Timing delay generators: Contract negotiations with Highland Technology are continuing in order to provide increased flexibility to the Project in phasing the procurement over several years. As a result of a meeting held at the vendor facility in December 1999, the vendor suggested a three-year schedule that guarantees a fixed price by front-loading (rather than amortizing over the product quantity) the nonrecurring engineering charge. The vendor also recommended that the full lot of certain critical parts should be purchased during the initial phase.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule. The FY99 Flashlight software milestone has been achieved. Flashlight was originally scheduled for September 15, 1999.

UPCOMING MAJOR ACTIVITIES

A major activity for the second quarter will be testing of the Flashlight software release in the B391 alignment laboratory and the B481 testbed. Construction of enhanced software intended for operation on preamplifier equipment has started, which is scheduled for release at the end of the second quarter FY2000. Acceptance testing of the master timing system hardware is scheduled for January 18-21, 2000 at the vendor's facility. Delivery is expected February 2000.

WBS 1.6 OPTICAL COMPONENTS

ACTIVITIES

KDP and DKDP Crystals

About half of the conventional growth tripler crystals are planted and growing at Cleveland Crystals, Inc. Two rapid-growth runs were completed for an additional yield of 13 doublers. There is now enough high-quality rapid growth material to produce 94 doublers and 89 switch crystals, plus material for 53 triplers that will meet initial NIF damage requirements. Two FY00 rapid-growth production runs were started at vendors.

Optical Pulse Generation and Injection System Optics

All 16 beamlines of the ILS have been modeled. The beam models are now being used to perform cost and performance trade-offs across the ILS to balance the placement and tilt tolerances of the optical components. As a result, an error in the placement of the injection window has been identified.

A preferred solution to the beam rotation and color separation grating (CSG) problems has been developed. The new optical configuration uses a wedged plano-convex lens tipped to minimize aspheric departure (and hence cost). It will be detailed in a baseline configuration memo in January.

Optical Component Processing

Specification MEL99-030-0A, Cleaning, Packaging, and Shipping of Uncoated Small (<150mm) Optical Substrates was issued to provide guidance for handling, cleaning, inspecting, packaging, marking, and shipping small optics. The Optics Quality Assurance & Metrology Plan Requirements for the NIF Pre-Amplifier Module (PAM) was completed to support this procurement. In addition, a suppliers list for critical and source-limited optical components was prepared using the experience of purchasing NIF prototype PAM optics.

QA and Damage Testing

Set-up of Large Optics Metrology Operations in the B391W metrology laboratory is essentially complete. There is still a temperature control problem in some of the rooms, which needs to be addressed and is currently expected to be resolved by the end of January.

A Memorandum of Understanding is in place that permits the use of an existing optical test facility for NIF small optics metrology. This facility, located in Building 490, has unique interferometry, photometry, and surface quality testing capabilities previously developed for the Atomic Vapor Laser Isotope Separation Program, resulting is a significant enhancement of test capabilities for NIF optics, particularly the small optics. Use of this facility eliminates the need to upgrade a metrology area in Building 392.

PROBLEMS / IMPACTS / CORRECTIVE ACTION

The change of the baseline optical design configuration for the FOA will eliminate the beam rotation and improve performance, but will impact the FOA mechanical design and require changes to the placement of the LM8 mirrors. This work is being tracked under the wedged lens study ECR. Additional detailed ECRs are expected in January and February.

A problem has been found in the optical design associated with the placement of the injection window. Existing mechanical hardware and hardware being procured will cause the window to be misplaced by several millimeters. Design changes are being evaluated to minimize this problem.

PROCUREMENTS

Rapid-growth production awards were placed with both CCI and Inrad in November. Four procurements (totaling $240K) were placed to support rapid growth work at LLNL including salt, polycarbonate growth tanks, damage samples, and support assembly hardware. Plastic PETG shipping containers were ordered to support initial production of all optic types.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

The new preliminary optical design of the FOA will be released in January. The new arrangement of the mirrors to implement the wedged lens design is expected in February.

WBS 1.7 LASER CONTROL

ACTIVITIES

Alignment Systems

The input sensor closed-loop alignment control functions are being tested as part of the Front End Integrated System Test (FEIST).

Beam Diagnostics

Release of design drawings under Configuration Management (CM) continues to be a concern. Weekly review of status, staffing, and priorities are performed to ensure the highest priority drawings are completed on a schedule consistent with the needs of the project. The design drawing status for WBS 1.7 is 1794 drawings completed (56%) of 3207 drawings required. The number of drawings required is larger than previously reported due to a more complete accounting and recognition that more drawings are required in some areas. The most notable areas with outstanding drawings are the Precision Diagnostics System (PDS) and the Roving Mirror Diagnostic Assembly (RMDA).

A draft of the specification for the PDS portion of CSP-19 was submitted in November for its 65% review, which was held in December. Approximately 75% of the required installation drawings and 30% of the GFE top assembly drawings were supplied for this review.

WBS 1.7 contributed to completion of three DOE milestones in November relating to software integration of FEPs: 1.7.2.4 (Energy Diagnostics), 1.7.2.5 (Power Diagnostics), and 1.7.1.4 (Motion Controls) “Flashlight” software releases. These releases consisted of basic sensor/digitizer operation, motion controls, and data display via maintenance GUIs.

Wavefront Control Systems

An order for the first wavefront controller VME crate was placed in November. This completed a DOE milestone (place orders for the first-article wavefront controller hardware, SC73300196).

A revised plan for completing the RMDA design was developed and implemented during the first quarter. Design model changes were completed and transferred from Los Alamos National Laboratory to LLNL. The engineering team is reviewing and updating the subsystem requirements.

Radiation testing of a sample of 3ω diagnostic fiber (manufactured by Vavilov Institute, St. Petersburg, Russia) showed that its transmission was degraded in high radiation fields. Follow-up tests were performed with a Russian-supplied, fluorine-doped fiber, and the results were encouraging. These results were discussed during a technical visit to the supplier in December.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Design changes to address the beam rotation problem affect details of the optical layout in the PDS. This is a relatively minor impact compared to those in other areas, but is noted nonetheless. Once the detailed optical path through the final optics is determined, then the detailed path through the last mirror in the PDS can be established and the hardware designs finalized; some GFE required for CSP-19 is affected. The corrective action in place is to participate in the beam rotation engineering effort.

PROCUREMENTS

The first-article tower kinematic mounts ($216K) was received and passed all tests. As reported last month, the contract was revised so that the hardware delivery does not impact critical path for CSP-13 schedule (delivery of all parts by 3/00).

Deliveries and anticipated deliveries of alignment control FEPs are on schedule with no issues ($2.2M of orders placed in October). These orders are split among four vendors: Power 10, VMIC, OMS, and Dawn. Through December, all of the input boards (136 units), output boards (136 units), motor controllers (1072 units), and power supplies (106 units) had been received. Production is starting on the VME crates (106 units)

The first 100 deformable mirror actuators are on schedule to be delivered by the end of January ($1.3M contract with Xinetics).

LLNL technical representatives visited the Vavilov Institute in St. Petersburg, Russia, in early December to witness and verify demonstration of the 3ω fiber contract deliverable ($0.6M contract). Work is proceeding on schedule (delivery of fiber during FY00 and FY01). A contract modification to obtain longer fibers will be implemented. This modification is required because of an approved engineering change request to relocate the 3ω power diagnostic sensor to the target area. (This results in longer fibers needed to connect the diagnostics to the equipment racks.) This modification will increase the value of the contract by approximately $0.5M.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

(1) Continue cost estimating, detail budget planning, development of CAPs, and overall project rebaseline planning; (2) complete the parts of PDS and RMDA designs needed for the 100% CSP-19 Review, currently scheduled for April; and (3) support testing associated with FEIST, which will involve using the prototype input sensor.

WBS 1.8 TARGET EXPERIMENTAL SYSTEM

ACTIVITIES

Target Chamber

Target Chamber: The target chamber is installed, and vacuum leak testing by PDM has been underway for four months. The contractor is repairing leaks found from the spray test, and the chamber appears to be tight. However, bagging complete ports in preparation for a full bag test indicates many O-ring leaks and dirty seal problems. Since this is an active construction site, the level of cleanliness required for removal and replacement of the O-rings is not now achievable. When the Target Bay is commissioned, the O-rings will be more easily sealed with the proper materials. The test approach was to bag only the lower portion of the weld necks, which allowed testing the chamber-to-weld-neck seals and the chamber seam welds. This completed test indicated there are no leaks greater than 1×10^{-8} atm cc/s in these welds. (This meets the leak rate specification of 1×10^{-5} atm cc/s.) In addition to the lower weld bag test, calibrated air leak and rate of pressure rise and partial pressure analyzer measurements were made. Initial analysis indicates that the partial pressure analyzer does not have the sensitivity in its current configuration to determine if the chamber is meeting the leak rate specification of 1×10^{-5} atm-cc/s. Additional initial analysis indicates that the leak rate is less than 1×10^{-3} atm-cc/s. Ongoing analysis will attempt to determine the current chamber leak rate. The upper weld neck flange welds would be tested after construction has been completed, and the covers could be removed with proper handling equipment and reinstalled with new O-rings.

Installation of the aluminum studs that hold the gunite rebar onto the chamber has been completed. Installation of the rebar was started the last week of November. Guniting of the neutron and gamma ray shield has started. The shell is a 16-inch-thick layer of borated (.14%) concrete that is applied to the outer surface of the target chamber by the gunite process. The application will be in two 8-inch layers. Each layer will have reinforcement bars (rebars) applied on a 5- by 5-inch grid. The initial 8-inch layer was completed by the end of December. The application went well.

First Wall: The detailed design of the first-wall panels was completed along with detailed assembly drawings. The installation of the panels is being validated using the ProE modeling software to insure proper spacing of the panels.

Target Chamber Vacuum System: Work continued on the target chamber, FOA, and diagnostic vacuum systems design documentation for the CSP-15 design package. A study was initiated to determine if the FOA rough vacuum system is adequate to meet pumpdown time and pressure requirements. Conductance and evacuation time analysis will be performed to

assess whether connections and piping are adequately sized to allow simultaneous pumping of all 48 FOAs and the target chamber in the desired one-hour time.

Target Positioning

Work on the detailed design of the target positioner has progressed to the 95% level. Procurement requisitions of some parts have been prepared.

Target Diagnostics

The diagnostic instrument manipulator (DIM) detailed mechanical drawing package is more than 95% complete. Work continues on testing the DIM prototype.

Target Area Structures

Target Area Government Furnished Equipment (GFE) Components: Design studies were performed in the target area in November to access the impact of moving the LM6, LM7, and LM8 mirrors. This led to design recommendations for modifications to the mirror frame structures to correct the beam rotation at the IOM that were presented to the Beam Rotation Working Group for evaluation. An assessment of the design and engineering effort required to revise the fabrication drawings and the stability calculations was performed. Cost and schedule impacts were provided for the ECR. An ECR was approved to begin design work in earnest on the proposed modifications. Procurements for all of the target bay GFE mirror frames, beam tubes, and associated guillotines have been put on hold pending final designs.

Target Area Beampath and Utilities: Parsons has continued work on the studies for the placement of work platforms around the target chamber that are required for the installation of the debris shields and IOM. Proposals were reviewed with Parsons and then were presented to the NIF operations staff and the LLNL Hazards control representative. Parsons will incorporate comments from these reviews and proceed to do detailed design. The Parsons structural designers have been preparing designs for support structures for the horizontal beam tubes and beam-tube inserts that line the concrete holes between the switchyard and the target bay.

Target Chamber Service System (TCSS): A Procurement Review for the Utility Lift was held to address procurement strategy, specification, Statement of Work, drawing package, and qualified supplier list. The plan is to Release for Bid as a phase-funded contract ($700K FY00; $500K FY01) in January. The contract will also include incentives for early delivery in an attempt to avoid delivery delays experienced by SF vessels and beam tubes. The Boom Lift 35% design review comment resolution with PaR Incorporated was completed in November.

The design of the lifting fixtures for the target area mirrors (LM6, 7, &8) was put on hold pending the outcome of the beam rotation issue at the target chamber. Mirror package sizes and locations will be established as part of the beam rotation response. Work is expected to resume in the next quarter.

Design efforts on IOM handling are continuing between LLNL and Parsons. Parsons is working designs for the level 40 hoists, the monorails, and the davit cranes.

Final Optics Assemblies

F*inal optics:* The utility and debris shield insertion fixture design drawings were released under configuration management. Fabrication of the 3ω calorimeter chamber is proceeding. More refined measurements of 3ω damage growth parameters were obtained for fused silica. The growth coefficient, which can be used to estimate optics lifetime, clearly has a threshold at ~5 J/cm^2 and a fluence-dependent growth rate.

Target Area Integration

Integration activities in the target area continue. Construction RFIs have been handled as needed.

The software requirement specifications (SRSs) for target area activities are being written. The first SRS was reviewed for content and format and was approved.

Problems / Impacts / Corrective Actions

Beam rotation issues continue to impact schedule and design completion costs. An ECR for preliminary design was approved by the CCB4 board in December. Another ECR will be prepared to cover cost and schedule impact of completing the final designs.

The design of cable trays and conduit in the diagnostic mezzanines have caused problems with clearance space for egress routes. Initial reviews indicate that all clearance problems with egress routes can be remedied.

As reported previously, a brief review of modeling data for the target positioner indicated that the vibration characteristics may be twice the amount budgeted. If this is true, the problem can be resolved by increasing the amount budgeted to the target positioner and reducing the amount budgeted from other areas that are below their budgeted amount.

The rebaselining effort continues to cause delays in the purchase of parts for the target positioner. However, there is enough float in the schedule so as to not cause an impact.

Emergency egress from the two 7’10” mezzanines is currently located by a ladder that restricts the allowed occupancy number to unacceptable levels. A location for a second set of stairs is being studied to solve this problem.

Procurements

The procurement for the target positioner boom was to be delivered in December. Recent information from the vendor indicates an early February delivery. The procurement for the vacuum valve for the first-article DIM has been prepared and will be placed in January.

VARIANCES

The rebaseline process has not been completed and, therefore, there are currently no variance statements for FY00 cost or schedule. As previously reported, the FY99 milestone, Award: Turning Mirror Structures, TA8410105, originally planned for May 1999, with an estimate for December 1999, will be further delayed due to the beam rotation problem. Preliminary projections are for phased award starting in April 2000.

The late delivery of the target positioner boom will not affect the overall schedule because of enough float in the schedule.

UPCOMING MAJOR ACTIVITIES

(1) Continue to contribute information to the Beam Rotation solution; (2) continue redesign of TB GFE components as required; (3) a design-build bid package for the Target Chamber Service System, with an estimated value of $1.2M, is planned to be released for bid in January 2000; (4) continue to work for completion of Title II designs for the target positioner, the first-wall panels, the DIM, and the target diagnostic data acquisition system; (5) start procurement of parts for the first-article DIM; (6) and finish the rebaselining activities.

WBS 1.9 OPERATIONS SPECIAL EQUIPMENT

OVERALL ASSESSMENT

The primary focus in Optical Transport and Material Handling has been on design/drawing completion of the delivery systems and the testing of the first-article systems. The integrated tests of the bottom-loading universal delivery system continues. The first fabrications and hardware for the flashlamp and amplifier slab delivery systems are in procurement and prototype tests of cover removal systems and cover seals are underway. The procurement process for the second and third transporters is under way and will be awarded next month.

ACTIVITIES

Optical Transport and Material Handling

Bottom-Loading Delivery Systems

Universal: The spatial filter insertion system (SFIS) procurement package was awarded and fabrication is proceeding slowly. An assembly, test, and storage stand for the SFIS system for use in B432 and the OAB is ready for fabrication. Alignment of all components is critical for successful installations. The precision engineering group in the Manufacturing and Material Engineering Division is working to generate a comprehensive alignment strategy and error budget for the canister and to bring the existing canister into alignment. Progress is slow due to the need for many measurements and fixtures. Completion of the alignment will be in January.

Flashlamp: The flashlamp canister weldment is progressing well at Lawrence Berkeley National Laboratory. Delivery of canister weldment is on schedule for February 2000. An order was placed with THK for the horizontal mechanisms that position the flashlamp LRUs for insertion, with a delivery of early March. Drawing package detailing of the cover removal, top plate, and carriage systems are nearly complete and will be finished in January.

Amplifier Slab: The production order for amplifier docking receivers is out for procurement. The long-lead actuators for the cover removal mechanism were ordered. The first-article cover latching mechanism was successfully tested. The detailed design of the LRU carriage assembly will be completed next month. The design of the cover translation mechanism is progressing.

Beamline Covers: The fabrication of the universal beamline covers and docking receivers is progressing. An RFQ for the cover seals has been prepared and will be sent out next month. Fixtures for conducting a leak

test of the covers in their use configuration with a docking plate are in fabrication. Testing will be completed next month. Leak testing of the flashlamp fit-up test covers is under way, and the covers are all passing the leak test with a slight improvement to an o-ring sealing surface for the latches. The production vendor will be alerted to the criticality of the surface texture to mitigate the need for touch up. The beamline cover radial seal design is complete with a seal design that is mechanically fastened to the covers. The cover design has been modified to incorporate this new design, and a first article is in procurement. The specifications and statement of work for the procurement of the beamline covers is converging with a few issues outstanding related to cleaning and assembly. The detailed design of the amplifier slab cassette cover was completed, and first-article parts are being fabricated. The order for the 1st bundle of slab production covers is out for procurement. The production order for cover gaskets is out for procurement. Fit-up test covers were leak tested and delivered to the amplifier group.

Controls: Noteworthy progress in transporter and canister controls during December includes the completion of the flashlamp motor multiplexer design. Components have been procured, and fabrication has begun. The amplifier slab motor control panel is complete, and the amplifier slab embedded controller plate has been fabricated and is being wired.

Top-Loading (TL) Delivery Systems

Assembly drawings are being completed and submitted under CM. Thirty vacuum covers that were warped have been successfully straightened. The first article vacuum vessel cover was successfully leak tested. The vacuum covers are on schedule for delivery starting next month.

Side-Loading (SL) Delivery Systems

Assembly drawings are being completed and submitted under CM. The SL tug drawings will be completed next month. The decision was made to transfer responsibility for installing the redesigned input sensors to the LRU owners.

Switchyard and Target Area Delivery Systems

The SY1 monorail system infrastructure drawing were initiated to support the CSP-19 construction package. These drawings will be complete by 1-31-00. The remainder of the SY/TB activity is on hold.

Laser Bay Transporter

AGV Products visited LLNL. Some modifications were done with the transporter movement sequences. The frame weldment package was also updated during the visit. The modified specifications for transporters #2 and #3 have been finalized and discussed with AGV Products. The new specifications include a new DC/AC inverter to accommodate all bottom-loading canisters power needs. The new specifications also include additional sensors to accommodate safety concerns. A modified bid from AGV Products is due to LLNL next month. The procurement of transporters #2 and #3 should be awarded next month. The fabrication of the

two transporters will take approximately six months once the procurement is awarded.

PROBLEMS, IMPACTS, AND CORRECTIVE ACTIONS

Engineering: Two additional technicians will be joining the group at the end of January. One additional engineer will be joining the group in January as well.

Transporter AVG Products, manufacturer of the transporter, has ordered and received new, faster motors to replace the original rear wheel steering motors. This will greatly reduce the time required for a sideways ("crab") motion of the transporter. The new motors will be installed onto the transporter during the visit of the AVG Products to LLNL.

VARIANCES

The rebaseline process has not been completed and therefore, there are currently no variance statements for FY00 cost or schedule.

UPCOMING MAJOR ACTIVITIES

The second and third transporters will be ordered in the next month. New motors will be installed during this quarter.

The alignment process of the universal bottom-loading canister will begin next month. The transporter will be used to align all carriage planes with respect to the docking ball plane.

During the second quarter of FY00, assembly and testing of the flashlamp and amplifier slab delivery systems will continue as fabrications and hardware are received.

WBS 1.10 START -UP ACTIVITIES

ACTIVITIES

Scope, schedule, and budget for this area are being reviewed, and plans will be discussed in the January monthly report.

PROBLEMS / CORRECTIVE ACTION

None.

PROCUREMENTS

None.

VARIANCES

UPCOMING MAJOR ACTIVITIES

WBS 1.11 ES&H AND SUPPORTING R&D

ACTIVITIES

Assurances

The DOE Quarterly construction safety review and fire safety walk-through was conducted. The Electrical Construction Site Safety Review by an independent team was completed, and the final report and recommendations discussed with the NIF Project.

Technical Support

Experimental work at both LLNL and the vendors to mitigate laser glass production problems contributing to over-spec values for platinum and water content is essentially complete. The kinetics of reaction between chlorine and platinum have been determined, and this has contributed to significant conditioner design changes at the vendors. The Pilot II production runs, beginning in mid-January at Schott Glass Technologies (SGT) and mid-April at Hoya, will incorporate refinements based on this work.

Shakedown testing of full-scale process units that are an integral part of the SGT melter system were completed in late November. Schott has completed all preparations for the mid-January start of Pilot II.

Schott began shipment of amplifier slab blanks from the Pilot I run to the NIF warehouse this quarter. All fine annealing of Pilot I laser glass amplifier slabs is complete. A total of 1570 slab equivalents of long-edge cladding strips and 1656 slab equivalents of short-edge cladding strips (1 equivalent of each needed to clad a laser amplifier slab) have been produced at Schott Glass from their FY99 cladding run.

All facets of the Hoya production unit are on schedule for a mid-April start-up. The melter is under construction, the calciner is being manufactured, and on-order melter system hardware modifications will ship in January.

Hoya continues to produce excellent quality and yields of edge-cladding glass in the cladding run that began August. All properties are within spec, and, as of the end of December, 1100 slab equivalents had been produced. Hoya has shipped Pilot I amplifier slabs from their first three post-processing campaigns.

Approximately 170 NIF lenses and windows are in process at Tinsley with nearly 100 in final testing. Process development is under way on the Lapmaster 120” continuous polisher, which is now being used to polish NIF windows. Metrology procedures, data reduction algorithms, data formats, and surface quality test procedures have been finalized between LLNL and Tinsley for lenses and windows. Custom software is being put in place to institutionalize the analysis procedures so that acceptance of

windows can begin in early 2QFY00. Lenses, however, will not be accepted until the Lens Optical Test System (LOTS) is operational in 3QFY00. Fabrication of the calibration spheres for the LOTS was completed by Corning OCA this quarter, and delivery of all major fabricated components is expected in 2QFY00.

Installation is complete for the 24" Wyko interferometer at Kodak. The unit successfully passed its acceptance tests after being relocated to a quieter location. Kodak has completed the first iteration of small-tool polishing an amplifier slab. Several LM2 mirrors have been completed through final testing and meet all the NIF specifications for this optic type. These parts are now being used to test Kodak's cleaning equipment and to validate their final cleaning procedures.

Zygo successfully corrected facility and interferometer problems that had been limiting their ability to final figure optics. Both 24" Zygo interferometers have passed final acceptance for normal and non-normal incidence testing over the entire spatial frequency region of interest. Twenty-three mirrors and fourteen AmplabII slabs have been accepted and shipped. The remaining AmplabII slabs will be completed in early January. A total of 52 polarizer blanks and 413 mirror blanks have been shipped from the BK7 blank vendors.

The repeatability of consecutive reflected wavefront measurements on the Spectra-Physics interferometer was improved by a factor of 2x by facility improvements. Qualification of the interferometer is expected in January. Modifications to the S-P planetary were made to eliminate bearing failures due to temperature-induced nonuniform stresses. The planetary has been installed in the coating chamber and is undergoing heat and load testing to validate performance.

The first Bauer photometer was delivered to the Laboratory for Laser Energetics (LLE) in October and has passed its acceptance test. Data from the new instrument played a key role in identifying the magnitude and source of a 3-lobe non-uniformity in LLE's coatings. New gears have been ordered and will be tested in 2QFY00 to ensure the defect is eliminated. LLE began its first pilot coating of a deformable mirror (LM1).

Initial wet-cut tests of KDP on the LLNL prototype semifinishing machine indicate that it will meet both the flatness (figure) and roughness NIF specification. The Moore final finishing machine achieved a maximum roughness of 5.6 nm-rms on a copper surrogate compared to the 3.0-nm-rms specification in an acceptance test. The best areas on the part were close to the roughness specification. While encouraging, there are still items on the machine that need improvement prior to acceptance.

The second KDP cleaning system was shipped from Forward Technologies in late November. It will be held in storage at LLNL until the KDP final-finishing vendor's facility is ready for beneficial occupancy. Com-

missioning of all of the OPDL KDP processing equipment is now complete, and NIF process development has begun on this equipment.

The first NIF-like lasers glass slabs were successfully cleaned in the JST systems. The Opticlean™ protective coating on the laser glass was relatively easy to remove, but a quick hand preclean was necessary to insure removal of all traces of the coating. Installation, start-up, and Management Prestart Review of the Chemat dip coating system was completed. Initial coating results are similar to those obtained at initial acceptance at Chemat. Some vibration effects are visible, apparently related to the relatively high vibration level in the OPDL.

A formal specification for maximum permissible gaseous organic contamination in any NIF enclosure containing a sol-gel coated optic was finalized. The specification limits reflectance gain to less than 0.1% per surface due to organic loading of the porous sol antireflection coating.

PROBLEMS / IMPACTS / CORRECTIVE ACTIONS

Kodak's Speedfam pad polisher has been limited by failure of the chiller. A replacement chiller is scheduled to be installed in January.

Tinsley is unable to ship lenses due to lack of optical test capability. They are focusing on completion of the LOTS, which is projected for 3QFY00. A previously reported issue with Tinsley's cleaning station has been resolved.

New gears are on order for an improved gear ratio on the LLE coating system to improve coating uniformity.

Failures of laser diodes in the Wyko interferometers continues to be a problem. A longer life version was expected to help this problem, but has failed after only six months. LLNL is working with Wyko/Veeco to locate a second source of diode assemblies. Because this is critical to metrology at LLNL and most of our vendors, Wyko is also being directed to design a backup plan that would incorporate a HeNe laser for better reliability.

PROCUREMENTS

Three ICF program-funded awards (WBS 2.8.6) were made in 1QFY00 including (1) Schott's main slab run for Pilot II awarded in 1QFY00, (2) a fixed-price contract to Kodak to fabricate 20 LM4a NIF laser mirrors, and (3) the final contract award for Spectra-Physics coatings pilot.

VARIANCES

The rebaseline process has not been completed, and therefore, there are currently no variance statements for FY00 cost or schedule.

Upcoming Major Activities

Schott Glass is planning to begin Pilot II laser glass production in mid-January 2000.

Hoya Corporation expects a mid-April start-up of laser glass Pilot II at the conclusion of their edge cladding run.

Kodak is scheduled to complete small-tool polishing of the first three amplifier slabs in January.

Zygo will ship their first finished amplifier slab in January.

An RFP for commercial fabrication of the second KDP semifinishing machine is expected to be issued in the second quarter of FY00.

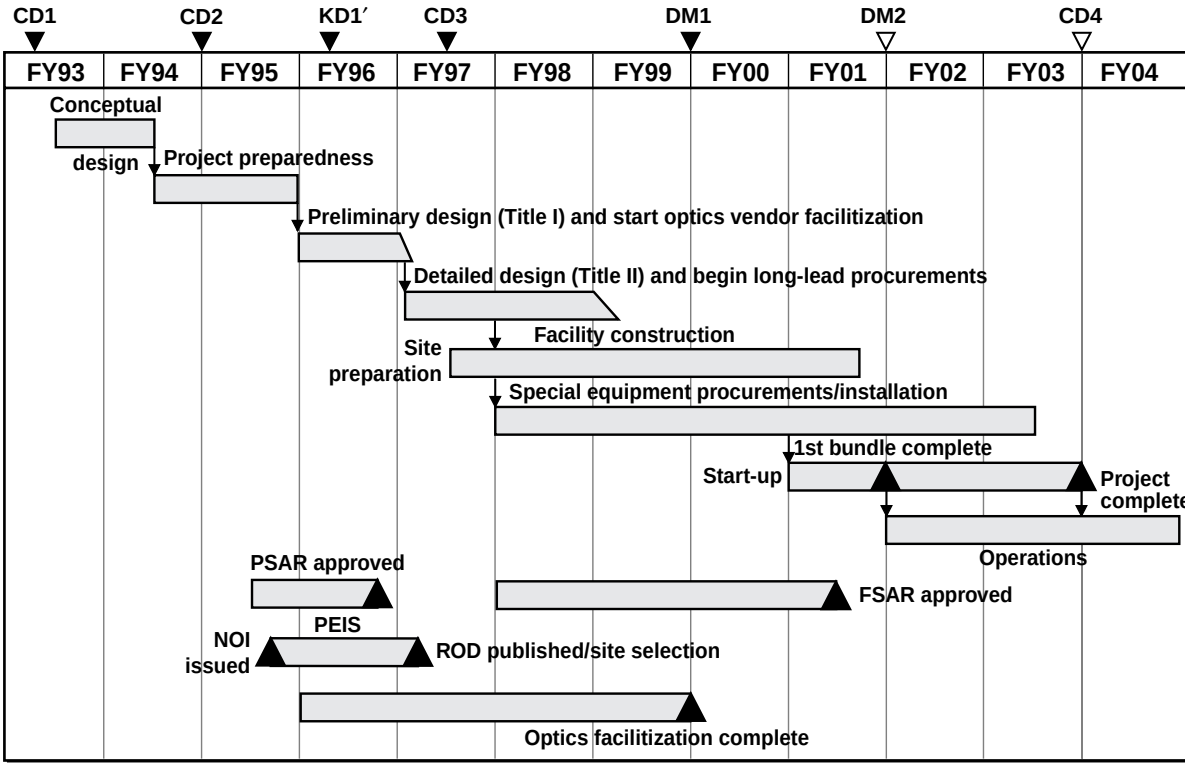
The DOE construction safety and fire safety reviews will be conducted for the second quarter.

ATTACHMENT 1: SCHEDULE STATUS

The schedule status section will provide (1) a summary schedule, (2) a status of the NIF Project Execution Plan milestones, (3) a status of the DOE performance measurement milestones, and (4) the critical path analysis.

At this point, Project schedules are being rebaselined to implement the completion options to be selected by the DOE. When the new schedules are prepared, they will be statused in the monthly report.

Summary Schedule



CD1 Approve mission need
CD2 Approve new start
KD1' Dellum's Process—NIF Study complete
CD3 Approve construction start
CD4 Approve Project completion
DM1 Optics Facilitization complete
DM2 End Conventional construction

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The rebaseline schedule will result in an update to the NIF Project major milestones to reflect the completion options proposed to the DOE. Until the rebaseline schedule is available, the current baseline will be statused.

Status of NIF Project Execution Plan Milestones

Milestones	DOE Acquisition Executive Level 0	DOE Office of Inertial Fusion and the NIF Project Level 1	NIF DOE Field Office Level 3	NIF Laboratory Project Office Level 3	Date Planned	Date Actual
Approval of Mission need (CD1)	X				Jan 1993	Jan 1993
CDR Complete				X	May 1994	May 1994
Approval of New Start (CD2)	X				Oct 1994	Oct 1994
Notice of Intent Issued		X			Jun 1995	Jun 1995
KD1' Dellums Process Complete	X				Dec 1995	Dec 1995
Architect/Engineer Contracted				X	Dec 1995	Dec 1995
Title I Initiated				X	Jan 1996	Jan 1996
Construction Manager Contracted				X	May 1996	May 1996
PSAR DOE Concurrence			X		Aug 1996	Aug 1996
PSAR Approved				X	Sep 1996	Sep 1996
NEPA Record of Decision	X				Sep 1996	Dec 1996
Approval to Initiate Title II Design			X		Sep 1996	Nov 1996
Approval to Initiate Long-Lead Procurement			X		Sep 1996	Nov 1996
Approval to Initiate Construction (CD3)	X				Mar 1997	Mar 1997
Issue Pollution Prevention & Waste Minimization Plan			X		Sep 1998	Sep 1998
Optics Facilitization Complete (DM1)		X			Oct 1999	Oct 1999
Start Special Equipment Installation				X	Nov 1998	Nov 1998
Target Chamber Installed				X	Oct 2000	
LTAB Superstructure Complete				X	Dec 2000	
FSAR DOE Concurrence			X		Feb 2001	
FSAR Approved				X	Mar 2001	
LTAB Construction Complete				X	Jul 2001	
End conventional Construction (DM2)		X			Sep 2001	
ORR/ORE Complete—Start Early Operations			X		Sep 2001	
End of Construction			X		Apr 2003	
Project Complete (CD4)	X				Oct 2003	

STATUS OF DOE PERFORMANCE MEASUREMENT MILESTONES

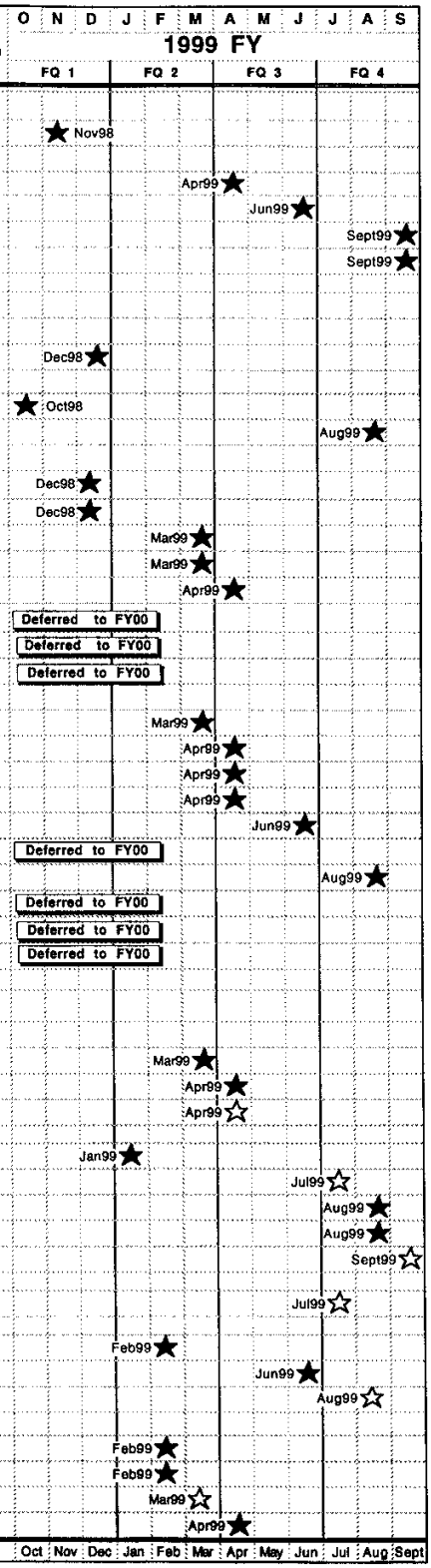
The FY99 DOE/OAK Performance Measurement Milestone (Rev. a) plan includes 106 milestones and was effective on 30June99 (NIF-0029504). The complete schedule, listing by WBS and date, and the Monthly Cumulative Report are provided in Attachment 1 at the back of this report. The milestone listing is sorted by date and grouped by month. That list is statused in this report.

A total of 86 of the FY99 milestones have been completed, five during 1Q00. The remaining cumulative variance for FY99 is 20 milestones. The estimated completion dates for all open milestones are listed in the attached report that is sorted by month. However, these estimates were made previous to the current NIF rebaselining activity, and in most cases are no longer valid. All remaining FY99 milestones will be replanned as appropriate per the new NIF baseline.

A major schedule concern was identified in July, and remains in November, due to the deviation between the actual milestones completed and the established baseline and the status of the Title II design completion.

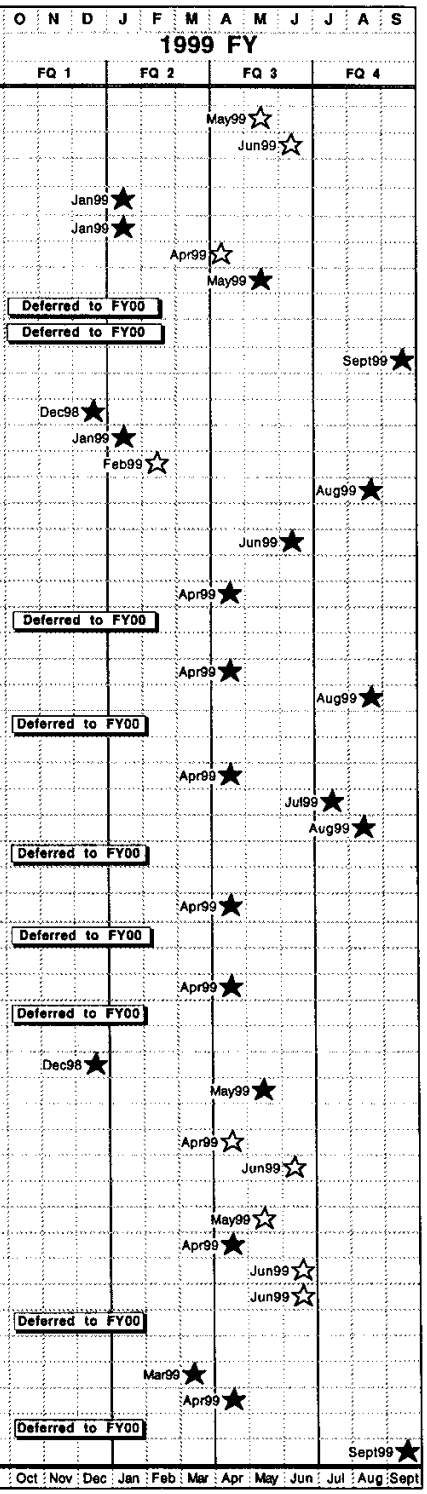
NIF Project FY99 Rev. a
DOE/OAK Performance Measurement Milestones

WBS	Activity Name	Milestone Number	Planned Date	Estimated Completion	Actual Completion
1.1	**Project Office**				
	Start Special Equipment Installation (Level 3)	307	Nov98		Oct98
1.1.3	**Assurances**				
1.1.3.3	Complete FSAR Draft	AS133070	Apr99		Mar99
1.1.3.1	Complete QA Program Plan Revision	AS13125210	Jun99		Jun99
1.1.3.1	Complete Project Control Manual Revisions	AS13120210	Sept99		Mar99
1.11.3	Complete Construction Safety Program Update	AS11130357	Sept99		Jul99
1.2	**Conventional Facilities**				
	CSP-4: Steel, Metal Decking & Siding, Roofing				
	Complete Phase I (Steelwork, Roofing, Siding except holdouts)	CF4M05010	Dec98		Dec98
	CSP-5: Optics Assembly Building				
	Ready for Special Equipment Installations (Basement)	CF50115S	Oct98		Oct98
	OAB Complete (Cleaned & Commissioned)	CF555221	Aug99		Nov99
	CSP-6/10: Target Area Building				
	Complete Waterproof/Backfill TB&SY2–North End to Grade	CF68116	Dec98		Apr99
	Complete Diagnostic Bldg Backfill	CF682901	Dec98		Apr99
	Finish SY2 East & West walls to 79'-7"	CF661701	Mar99		Mar99
	Ready for Target Chamber Installation	CF6M2400	Mar99		Mar99
	SY2 Ready for Spaceframe Installation	CF6M2500	Apr99		Apr99
	SY2–Start Erecting Work Platform & Scaffolding	CFA135499		Oct99	
	SY2–Start Setting Pre-Cast Girders	CF663799		Oct99	
	SY2–Finish Roofing & Insulation	CF664211		Jan00	
	CSP-9: Laser Bldg. Finish & Central Plant				
	Central Plant Ready for Occupancy	CF9CPT020	Mar99		Apr99
	Cooling Towers Ready for Occupancy	CF9CTR020	Apr99		Jun99
	LB2 Ready for Beam Transport Installation	CF9M2700	Apr99		May99
	LB1 Ready for Beam Transport Installation	CF9M2600	Apr99		Jun99
	Start Removing LB1&2 Work Platforms	CF9LB1289	Jun99		Mar99
	CB3&4 Complete (Cleaned & Commissioned)	CF9131701		Dec99	
	LB1&2 Overhead Cranes Available	CF9M4000	Aug99		Aug99
	CB1 Complete (Cleaned & Commissioned)	CF9132101		Feb00	
	CB2 Complete (Cleaned & Commissioned)	CF9132901		Feb00	
	MOR & PAMMA Ready for Special Equipment Installation	CF9M2900		Oct99	
	Special Equipment				
1.3.1	**Optical Pulse Generation System**				
	Award: First Bundle Amplitude Modulator Chasis	LS3110039	Mar99		Mar99
	Award: First Bundle Fiber Amplifier	LS3110047	Apr99		Jan99
	Award: First Bundle PABTS Hardware	LS3130228	Apr99	FY01	
1.3.2	**Amplifier System**				
	Award: FAU Enclosures–First Bundle	LS3200132	Jan99		Mar99
	Complete Awards: First Bundle Amplifier Mechanical Parts...	LS3200...	Jul99	Dec00	
	Award: NIF Flashlamps	LS3200078	Aug99		Sep99
	Award: FAU Enclosures–First 50%	LS3200135	Aug99		Mar99
	Award: First 50% Flashlamp Reflectors	LS3200102	Sept99	2Q00	
1.3.3	**Pockels Cell System**				
	Complete Awards: First Bundle PEPC Assembly...	LS33.....	Jul99	2Q00	
1.3.4	**Power Conditioning System**				
	Title II (100%) Design Review	SE340010	Feb99		Feb99
	Award: NIF Capacitors, First Bundle	SE340081	Jun99		Sep99
	Complete Awards: First Bundle Power Cond. Components...	LS34.....	Aug99	2Q00	
1.4.1	**Beam Transport Vessels/Enclosures**				
	Award: LB2 Interstage Enclosures	BT4100108	Feb99		Apr99
	Award: Precision Cleaning Contract	BT4100127	Feb99		Mar99
	Award: Roving Diagnostic Mirror Enclosure	BT4100082	Mar99	≥2Q00	
	Award: SF Beam Tube Bellows & Spools	BT4100035	Apr99		Jul99



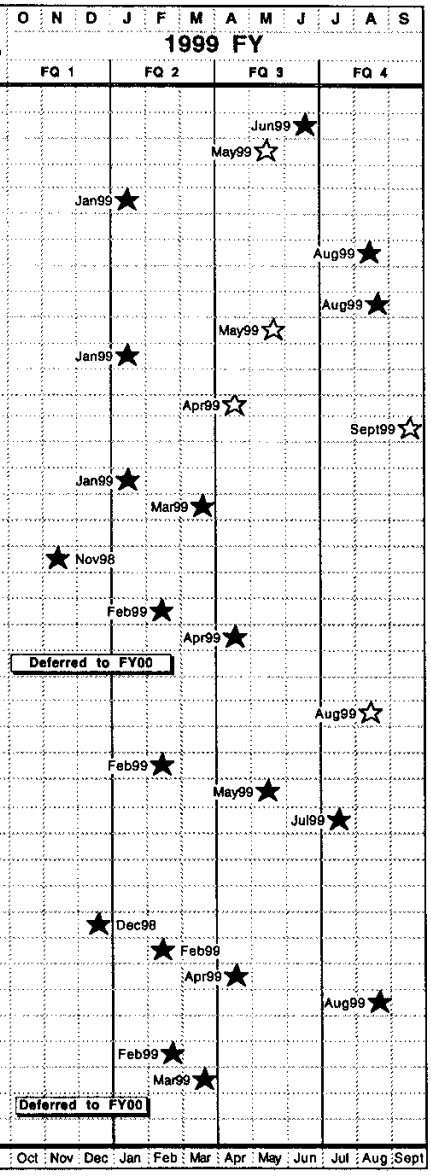
NIF Project FY99 Rev. a
DOE/OAK Performance Measurement Milestones

WBS	Activity Name	Milestone Number	Planned Date	Estimated Completion	Actual Completion
1.4.2	**Auxiliary Systems**				
	Award: Amplifier Cooling Ducts	BT4220017	May99	2Q00	
	Complete Awards: Vacuum System, First Bundle...	BT421.....	Jun99	2Q00	
1.4.3	**Support Structures**				
	Award: Laser Bay Concrete Pedestals	BT4320044	Jan99		Jan99
	Award: SY2 Fabrication Contract	BT43xxxxxx	Jan99		Jan99
	Award: LB1/LB2 Catwalks, Utility Racks, Beam Tube Supports	BT4320035	Apr99	2Q00	
	Start Installation SY2 Structure	BT4310022	May99		Jun99
	Complete Concrete Pedestals LB2	BT4320048		Oct99	
	Complete Concrete Pedestals LB1	BT4320050		Nov99	
	Award: SY1 Fabrication Contract	BT43xxxxxx	Sept99		Jun99
1.4.4	**Optical Mounts**				
	Award:SF1&2 LRU Fabrication	OM4430023	Dec98		Dec98
	Award: First Bundle Transport Mirror Actuator Package	OM44100375	Jan99		Jan99
	Award: Periscope Cassette Frame	OM44200636	Feb99	≥2Q00	
	LRU Assembly Verification System (LAVS) Installed In OAB	OM4440026	Aug99		Nov99
1.4.5	**Beam Transport Integration**				
	Award: Steam Cleaning Equipment	BT4500023	Jun99		Jul99
1.5.2	**Supervisory Controls**				
	Demonstrate 2nd Production Prototype (Penlight)	IC5210005....	Apr99		Jun99
	Demonstrate 3rd Production Prototype (Flashlight)	IC5210009....		Jan00	
1.5.3	**Integrated Timing System**				
	Complete Penlight Testbed Demonstration	IC5300032	Apr99		Apr99
	Complete Awards: Integrated Timing System...	IC53.....	Aug99		Sep99
	Complete Flashlight Testbed Demonstration	IC5300036		Jan00	
1.5.4	**Safety System**				
	Complete Penlight Demonstration	IC5410013	Apr99		Apr99
	Award: Access Control System	IC5420010	Jul99		Sep99
	Complete Awards for Integrated Safety System First Bundle	IC5410021	Aug99		Sep99
	Complete Flashlight Demonstration	IC5410015		Jan00	
1.5.5	**Auto Alignment System**				
	Complete Penlight Demonstration	IC5500035	Apr99		Apr99
	Complete Flashlight Demonstration	IC5500042		Jan00	
1.5.6	**Ancillary systems**				
	Complete Penlight Demonstration	IC5610013	Apr99		Apr99
	Complete Flashlight Demonstration	IC5610017		Jan00	
1.6.10	**Optical Design**				
	Complete OPG Optics Drawings (CM)	OM6A10103	Dec98		Jan99
	Complete Alignment & Diagnostics Optics Drawings (CM)	OM6A10112	May99		Aug99
1.7.1	**Alignment System**				
	Award: First Bundle Input Sensors	SC7110031	Apr99	2Q00	
	Complete Awards: First Bundle Alignment Hardware...	SC71.....	Jun99	≥2Q00	
1.7.2	**Beam Diagnostics**				
	Award: Output Sensor & Relay Optics	SC72200175	May99	2Q00	
	Second Production Prototype Demo (Penlight)	SC7250027	Apr99		May99
	Award: Roving Mirror System	SC7270010	Jun99	≥2Q00	
	Complete Awards: Beam Diagnostics Hardware...	SC72.....	Jun99	FY00	
	Third Production Prototype Demo (Flashlight)	SC7260013		Oct99	
1.7.3	**Wavefront Control**				
	Award: Deformable Mirror Contract	SC7310030	Mar99		Mar99
	Demonstrate 2nd Production Prototype (Penlight)	SC73300145	Apr99		Apr99
	Demonstrate 3rd Production Prototype (Flashlight)	SC73300165		Jan00	
	Award: First Bundle Controller Equipment	SC73300196	Sept99		Dec99



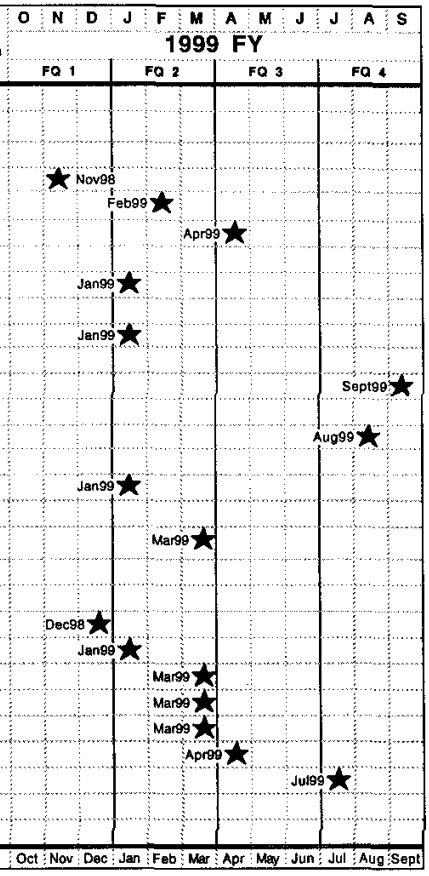
NIF Project FY99 Rev. a
DOE/OAK Performance Measurement Milestones

WBS	Activity Name	Milestone Number	Planned Date	Estimated Completion	Actual Completion
1.8.1	**Target Chamber**				
	Target Chamber Installed on Pededstal in Target Bay	TA8110160	Jun99		Jun99
	Complete Awards: Target Chamber Vacuum System...	TA8150....	May99	2Q00	
1.8.2	**Target Positioner**				
	Award: TARPOS Fabrication Contracts (Boom, Valve, etc)	TA8200120...	Jan99		Apr99
1.8.3	**Target Diagnostics**				
	Complete Diagnostics Systems Title II (65%) Design Reviews...	TA83.....	Aug99		Sep99
1.8.4	**Target Structures**				
	Complete Title II (100%) Design Reviews...	TA84.....	Aug99		Jul99
	Award: Turning Mirror Structures	TA8410105	May99	Dec99	
	Award: Target Chamber Restraints	TA84600065	Jan99		Feb99
1.8.6	**Target Auxiliary Systems**				
	Title II (100%) Design Review – Chamber Lift Contract	TA8641170	Apr99	2Q00	
	Award: IOM Hoist	TA8642040	Sept99	Feb00	
1.8.7	**Final Optics**				
	Award First Article Vacuum Isolation Valve	OM87300031	Jan99		Jun99
	Award: First Bundle FOC	OM87100335	Mar99		Oct99
1.8.8	**Target Area Integration**				
	Award: Chamber Lifting Crane Contract	TA8850010	Nov98		Jan99
1.9.1	**Operations Systems Controls**				
	Title II (100%) Design Review – Supervisory Controls	OE19120050	Feb99		Jun99
	Title II (100%) Design Review – Safety Interlocks & Video	OE19121090	Apr99		Jun99
	Supervisory Controls Software 3rd Production Release	OE19120600		Jan00	
1.9.2	**Optical Transport & Material Handling**				
	Complete Awards: Bottom Loading Assemblies...	OE9211.....	Aug99	2Q00	
1.9.3	**Optical Assembly & Alignment Systems**				
	Complete Awards: OAB Equipment...	OE93.....	Feb99		Jun99
	Title II (100%) Design Review – OAB Systems	OE93100260	May99		Jun99
	Start Installation of OAB Equipment	OE93100280	Jul99		Nov99
	Start-Up & Integration				
1.1.5	**System Integration**				
	Title II (100%) Design Review : Rack Cooling	SI11510800	Dec98		Dec98
	Title II (100%) Design Reviews Complete: Cable Plant	SI11511365	Feb99		Mar99
	Title II (100%) Design Review: Survey Plan	SI11500660	Apr99		Feb99
	Award: Rack Cooling Units	SI15005100	Aug99		Sep99
1.10	**Start-Up Activities**				
	Complete Preliminary Master Test Plan Review	SU00320395	Feb99		Mar99
	Operability Model Completed	SU00310307	Mar99		Mar99
	Complete Start-up Execution and Staffing Plan	SU00320210		TBD	



NIF Project FY99 Rev. a
DOE/OAK Performance Measurement Milestones

WBS	Activity Name	Milestone Number	Planned Date	Estimated Completion	Actual Completion
	Optical Components				
1.6.1	**Amplifier Slabs**				
	Award: Nd Material for Laser Glass (LLNL)	AM025710	Nov98		Nov98
	Complete Awards: Hoya Production Preparation Contracts...	AM016220	Feb99		Feb99
	Complete Awards: Schott Production Preparation Contracts...	AM031302	Apr99		Jul99
1.6.2	**Lenses**				
	Award: Fused Silica Lens Material Production Contracts...	LW04TY140	Jan99		Jan99
1.6.3	**Mirrors**				
	Initial Production Order for Mirror Blanks	PL00519	Jan99		Jan99
1.6.4	**Polarizers**				
	Finalize Production Split for Polarizer Blanks	PL00523	Sept99		Feb99
1.6.5	**KDP & KD*P Crystals**				
	Award Rapid Growth Production Contract	KD042700	Aug99		May99
1.6.6	**Debris Shields & Windows**				
	Award: Fused Silica Material Production Contracts...	LW0500290	Jan99		Jan99
1.6.8	**Optics Processing**				
	Complete Awards: Shipping Containers for First Cluster	QM00SH4950	Mar99		May99
	Optics Technology				
1.11.6.1	Award KDP Finishing Facilitization Contract (Phase II/III)	KD10600	Dec98		Dec98
1.11.6.3	Aqueus Auto Cleaning Systems Ready for Delivery	PR000390	Jan99		Jan99
1.11.6.3	Sol Gel Dip Coater Ready for Delivery	PR000740	Mar99		Jun99
1.11.6.1	LLE Coating Facility Complete	PL00272	Mar99		Jul99
1.11.6.1	Tinsley Ready for Main Pilot	LW04TY283	Mar99		Feb99
1.11.6.1	Spectra-Physics Coating Facility Complete	PL00373	Apr99		Jul99
1.11.6.1	Kodak Finishing Facility Complete	LW0KD005	Jul99		Sep99



NIF Project FY99 (Rev. a)
DOE/OAK Performance Measurement Milestones
Monthly Cumulative Report
December 1999

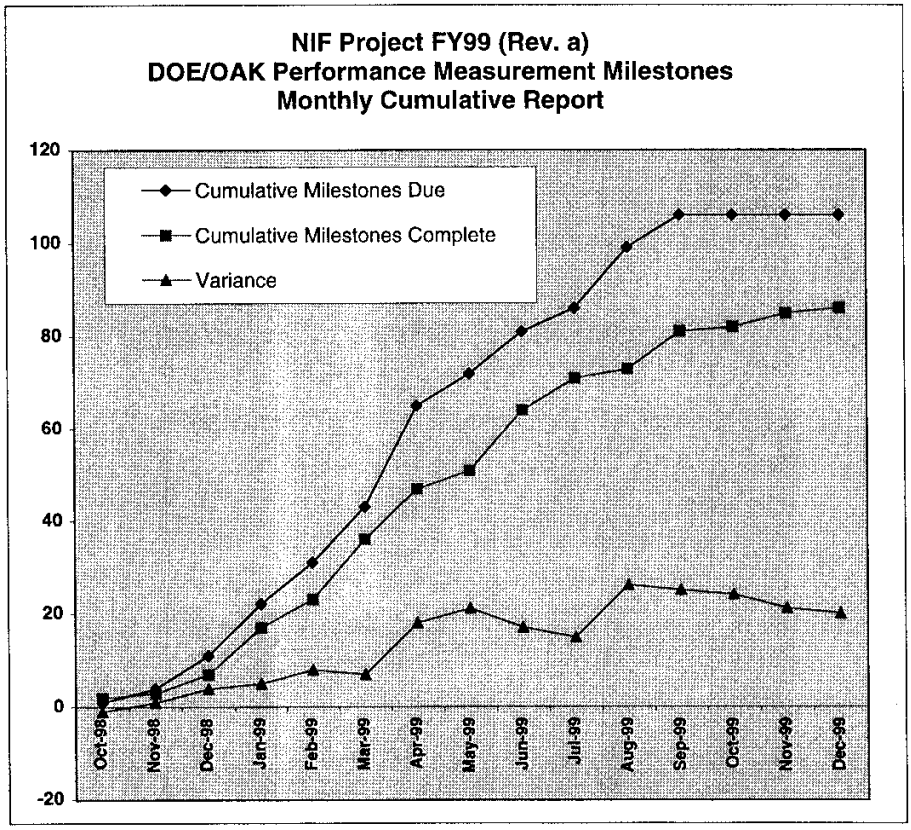
WBS	Activity Name		Milestone Number	Planned Date	Estimated Completion	Actual Completion
1.2	CSP-5: Optics Assembly Building	Ready for Special Equipment Installations (Basement)	CF50115S	Oct-98		Oct-98
1.1	Project Office	Start Special Equipment Installation (Level 3)	307	Nov-98		Oct-98
1.8.8	Target Area Integration	Award: Chamber Lifting Crane Contract	TA8850010	Nov-98		Jan-99
1.6.1	Amplifier Slabs	Award: Nd Material for Laser Glass (LLNL)	AM025710	Nov-98		Nov-98
1.2	CSP-4: Steel, Metal Decking & Siding, Roofing	Complete Phase I (Steelwork, Roofing, Siding except holdouts)	CF4M05010	Dec-98		Dec-98
1.2	CSP-6/10: Target Area Building	Complete Waterproof/Backfill TB&SY2–North End to Grade	CF68116	Dec-98		Apr-99
1.2	CSP-6/10: Target Area Building	Complete Diagnostic Bldg Backfill	CF682901	Dec-98		Apr-99
1.4.4	Optical Mounts	Award:SF1&2 LRU Fabrication	OM4430023	Dec-98		Dec-98
1.6.10	Optical Design	Complete OPG Optics Drawings (CM)	OM6A10103	Dec-98		Jan-99
1.1.5	System Integration	Title II (100%) Design Review : Rack Cooling	SI11510800	Dec-98		Dec-98
1.11.6.1	Optics Technology	Award KDP Finishing Facilitization Contract (Phase II/III)	KD10600	Dec-98		Dec-98
1.3.2	Amplifier System	Award: FAU Enclosures–First Bundle	LS3200132	Jan-99		Mar-99
1.4.3	Support Structures	Award: Laser Bay Concrete Pedestals	BT4320044	Jan-99		Jan-99
1.4.3	Support Structures	Award: SY2 Fabrication Contract	BT43xxxxxx	Jan-99		Jan-99
1.4.4	Optical Mounts	Award: First Bundle Transport Mirror Actuator Package	OM44100375	Jan-99		Jan-99
1.8.2	Target Positioner	Award: TARPOS Fabrication Contracts (Boom, Valve, etc)	TA8200120...	Jan-99		Apr-99
1.8.4	Target Structures	Award: Target Chamber Restraints	TA84600065	Jan-99		Feb-99
1.8.7	Final Optics	Award First Article Vacuum Isolation Valve	OM87300031	Jan-99		Jun-99
1.6.2	Lenses	Award: Fused Silica Lens Material Production Contracts	LW04TY140	Jan-99		Jan-99
1.6.3	Mirrors	Initial Production Order for Mirror Blanks	PL00519	Jan-99		Jan-99
1.6.6	Debris Shields & Windows	Award: Fused Silica Material Production Contracts	LW0500290	Jan-99		Jan-99
1.11.6.3	Optics Technology	Aqueus Auto Cleaning Systems Ready for Delivery	PR000390	Jan-99		Jan-99
1.3.4	Power Conditioning System	Title II (100%) Design Review	SE340010	Feb-99		Feb-99
1.4.1	Beam Transport Vessels/Enclosures	Award: LB2 Interstage Enclosures	BT4100108	Feb-99		Apr-99
1.4.1	Beam Transport Vessels/Enclosures	Award: Precision Cleaning Contract	BT4100127	Feb-99		Mar-99
1.4.4	Optical Mounts	Award: Periscope Cassette Frame	OM44200636	Feb-99	≥2Q00	
1.9.1	Operations Systems Controls	Title II (100%) Design Review – Supervisory Controls	OE19120050	Feb-99		Jun-99
1.9.3	Optical Assembly & Alignment Systems	Complete Awards: OAB Equipment	OE93.....	Feb-99		Jun-99
1.1.5	System Integration	Title II (100%) Design Reviews Complete: Cable Plant	SI11511365	Feb-99		Mar-99
1.1	Start-Up Activities	Complete Preliminary Master Test Plan Review	SU00320395	Feb-99		Mar-99
1.6.1	Amplifier Slabs	Complete Awards: Hoya Production Preparation Contracts	AM016220	Feb-99		Feb-99
1.2	CSP-6/10: Target Area Building	Finish SY2 East & West walls to 79'-7"	CF661701	Mar-99		Mar-99
1.2	CSP-6/10: Target Area Building	Ready for Target Chamber Installation	CF6M2400	Mar-99		Mar-99
1.2	CSP-9: Laser Bldg. Finish & Central Plant	Central Plant Ready for Occupancy	CF9CPT020	Mar-99		Apr-99
1.3.1	Optical Pulse Generation System	Award: First Bundle Amplitude Modulator Chasis	LS3110039	Mar-99		Mar-99
1.4.1	Beam Transport Vessels/Enclosures	Award: Roving Diagnostic Mirror Enclosure	BT4100082	Mar-99	≥2Q00	
1.7.3	Wavefront Control	Award: Deformable Mirror Contract	SC7310030	Mar-99		Mar-99
1.8.7	Final Optics	Award: First Bundle FOC	OM87100335	Mar-99		Oct-99
1.1	Start-Up Activities	Operability Model Completed	SU00310307	Mar-99		Mar-99
1.6.8	Optics Processing	Complete Awards: Shipping Containers for First Cluster	QM00SH4950	Mar-99		May-99
1.11.6.3	Optics Technology	Sol Gel Dip Coater Ready for Delivery	PR000740	Mar-99		Jun-99
1.11.6.1	Optics Technology	LLE Coating Facility Complete	PL00272	Mar-99		Jul-99
1.11.6.1	Optics Technology	Tinsley Ready for Main Pilot	LW04TY283	Mar-99		Feb-99
1.1.3.3	Assurances	Complete FSAR Draft	AS133070	Apr-99		Mar-99
1.2	CSP-6/10: Target Area Building	SY2 Ready for Spaceframe Installation	CF6M2500	Apr-99		Apr-99
1.2	CSP-9: Laser Bldg. Finish & Central Plant	Cooling Towers Ready for Occupancy	CF9CTR020	Apr-99		Jun-99
1.2	CSP-9: Laser Bldg. Finish & Central Plant	LB2 Ready for Beam Transport Installation	CF9M2700	Apr-99		May-99
1.2	CSP-9: Laser Bldg. Finish & Central Plant	LB1 Ready for Beam Transport Installation	CF9M2800	Apr-99		Jun-99
1.3.1	Optical Pulse Generation System	Award: First Bundle Fiber Amplifier	LS3110047	Apr-99		Jan-99
1.3.1	Optical Pulse Generation System	Award: First Bundle PABTS Hardware	LS3130228	Apr-99	FY01	
1.4.1	Beam Transport Vessels/Enclosures	Award: SF Beam Tube Bellows & Spools	BT4100035	Apr-99		Jul-99
1.4.3	Support Structures	Award: LB1/LB2 Catwalks, Utility Racks, Beam Tube Supports	BT4320035	Apr-99	2Q00	
1.5.2	Supervisory Controls	Demonstrate 2nd Production Prototype (Penlight)	IC5210005....	Apr-99		Jun-99
1.5.3	Integrated Timing System	Complete Penlight Testbed Demonstration	IC5300032	Apr-99		Apr-99
1.5.4	Safety System	Complete Penlight Demonstration	IC5410013	Apr-99		Apr-99
1.5.5	Auto Alignment System	Complete Penlight Demonstration	IC5500035	Apr-99		Apr-99
1.5.6	Ancillary systems	Complete Penlight Demonstration	IC5610013	Apr-99		Apr-99
1.7.1	Alignment System	Award: First Bundle Input Sensors	SC7110031	Apr-99	2Q00	
1.7.2	Beam Diagnostics	Second Production Prototype Demo (Penlight)	SC7250027	Apr-99		May-99
1.7.3	Wavefront Control	Demonstrate 2nd Production Prototype (Penlight)	SC73300145	Apr-99		Apr-99
1.8.6	Target Auxiliary Systems	Title II (100%) Design Review – Chamber Lift Contract	TA8641170	Apr-99	2Q00	
1.9.1	Operations Systems Controls	Title II (100%) Design Review – Safety Interlocks & Video	OE19121090	Apr-99		Jun-99
1.1.5	System Integration	Title II (100%) Design Review: Survey Plan	SI11500660	Apr-99		Feb-99
1.6.1	Amplifier Slabs	Complete Awards: Schott Production Preparation Contracts	AM031302	Apr-99		Jul-99
1.11.6.1	Optics Technology	Spectra–Physics Coating Facility Complete	PL00373	Apr-99		Jul-99

NIF Project FY99 (Rev. a)
DOE/OAK Performance Measurement Milestones
Monthly Cumulative Report
December 1999

WBS	Activity Name		Milestone Number	Planned Date	Estimated Completion	Actual Completion
1.4.2	Auxiliary Systems	Award: Amplifier Cooling Ducts	BT4220017	May-99	2Q00	
1.4.3	Support Structures	Start Installation SY2 Structure	BT4310022	May-99		Jun-99
1.6.10	Optical Design	Complete Alignment & Diagnostics Optics Drawings (CM)	OM6A10112	May-99		Aug-99
1.7.2	Beam Diagnostics	Award: Output Sensor & Relay Optics	SC72200175	May-99	2Q00	
1.8.1	Target Chamber	Complete Awards: Target Chamber Vacuum System	TA8150....	May-99	2Q00	
1.8.4	Target Structures	Award: Turning Mirror Structures	TA8410105	May-99	Dec-99	
1.9.3	Optical Assembly & Alignment Systems	Title II (100%) Design Review – OAB Systems	OE93100260	May-99		Jun-99
1.1.3.1	Assurances	Complete QA Program Plan Revision	AS13125210	Jun-99		Jun-99
1.20	CSP-9: Laser Bldg. Finish & Central Plant	Start Removing LB1&2 Work Platforms	CF9LB1289	Jun-99		Mar-99
1.3.4	Power Conditioning System	Award: NIF Capacitors, First Bundle	SE340081	Jun-99		Sep-99
1.4.2	Auxiliary Systems	Complete Awards: Vacuum System, First Bundle	BT421.....	Jun-99	2Q00	
1.4.5	Beam Transport Integration	Award: Steam Cleaning Equipment	BT4500023	Jun-99		Jul-99
1.7.1	Alignment System	Complete Awards: First Bundle Alignment Hardware	SC71.....	Jun-99	≥2Q00	
1.7.2	Beam Diagnostics	Award: Roving Mirror System	SC7270010	Jun-99	≥2Q00	
1.7.2	Beam Diagnostics	Complete Awards: Beam Diagnostics Hardware	SC72.....	Jun-99	FY00	
1.8.1	Target Chamber	Target Chamber Installed on Pededstal in Target Bay	TA8110160	Jun-99		Jun-99
1.3.2	Amplifier System	Complete Awards: First Bundle Amplifier Mechanical Parts	LS3200...	Jul-99	Dec-00	
1.3.3	Pockels Cell System	Complete Awards: First Bundle PEPC Assembly	LS33.....	Jul-99	2Q00	
1.5.4	Safety System	Award: Access Control System	IC5420010	Jul-99		Sep-99
1.9.3	Optical Assembly & Alignment Systems	Start Installation of OAB Equipment	OE93100280	Jul-99		Nov-99
1.11.6.1	Optics Technology	Kodak Finishing Facility Complete	LW0KD005	Jul-99		Sep-99
1.2	CSP-5: Optics Assembly Building	OAB Complete (Cleaned & Commissioned)	CF555221	Aug-99		Nov-99
1.2	CSP-9: Laser Bldg. Finish & Central Plant	LB1&2 Overhead Cranes Available	CF9M4000	Aug-99		Aug-99
1.3.2	Amplifier System	Award: NIF Flashlamps	LS3200078	Aug-99		Sep-99
1.3.2	Amplifier System	Award: FAU Enclosures–First 50%	LS3200135	Aug-99		Mar-99
1.3.4	Power Conditioning System	Complete Awards: First Bundle Power Cond. Components	LS34.....	Aug-99	2Q00	
1.4.4	Optical Mounts	LRU Assembly Verification System (LAVS) Installed in OAB	OM4440026	Aug-99		Nov-99
1.5.3	Integrated Timing System	Complete Awards: Integrated Timing System	IC53.....	Aug-99		Sep-99
1.5.4	Safety System	Complete Awards for Integrated Safety System First Bundle	IC5410021	Aug-99		Sep-99
1.8.3	Target Diagnostics	Complete Diagnostics Systems Title II (65%) Design Reviews	TA83.....	Aug-99		Sep-99
1.8.4	Target Structures	Complete Title II (100%) Design Reviews	TA84.....	Aug-99		Jul-99
1.9.2	Optical Transport & Material Handling	Complete Awards: Bottom Loading Assemblies	OE9211.....	Aug-99	2Q00	
1.1.5	System Integration	Award: Rack Cooling Units	SI15005100	Aug-99		Sep-99
1.6.5	KDP & KD*P Crystals	Award Rapid Growth Production Contract	KD042700	Aug-99		May-99
1.1.3.1	Assurances	Complete Project Control Manual Revisions	AS13120210	Sep-99		Mar-99
1.11.3	Assurances	Complete Construction Safety Program Update	AS11130357	Sep-99		Jul-99
1.3.2	Amplifier System	Award: First 50% Flashlamp Reflectors	LS3200102	Sep-99	2Q00	
1.4.3	Support Structures	Award: SY1 Fabrication Contract	BT43xxxxx	Sep-99		Jun-99
1.7.3	Wavefront Control	Award: First Bundle Controller Equipment	SC73300196	Sep-99		Dec-99
1.8.6	Target Auxiliary Systems	Award: IOM Hoist	TA8642040	Sep-99	Feb-00	
1.6.4	Polarizers	Finalize Production Split for Polarizer Blanks	PL00523	Sep-99		Feb-99

NIF Project FY99 (Rev. a)
DOE/OAK Performance Measurement Milestones
Monthly Cumulative Report
December 1999

Month	Cumulative Milestones Due	Cumulative Milestones Complete	Variance	Milestones Due	Milestones Complete
Oct-98	1	2	-1	1	1
Nov-98	4	3	1	3	3
Dec-98	11	7	4	7	7
Jan-99	22	17	5	11	11
Feb-99	31	23	8	9	8
Mar-99	43	36	7	12	11
Apr-99	65	47	18	22	18
May-99	72	51	21	7	3
Jun-99	81	64	17	9	0
Jul-99	86	71	15	5	3
Aug-99	99	73	26	13	11
Sep-99	106	81	25	7	5
Oct-99	106	82	24	0	0
Nov-99	106	85	21	0	0
Dec-99	106	86	20	0	0
			Total Milestones Completed in Reporting Month ==>		1



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1/19/00

ATTACHMENT 2: FINANCIAL STATUS

The financial status includes (1) 1Q00 cumulative-to-date Project financial summaries by WBS Level 2 and by participant; (2) FY00 plan to actual Cost and Cost plus Commitments monthly for Total Project Cost, Total Estimated Cost, Other Project Cost, and each WBS Level 2 element; (3) the quarterly Contingency Log; and (4) FY00 quarterly manpower plan to actual.

PROJECT PLAN TO ACTUAL COST AND COST PLUS COMMITMENTS

FY00 NIF Cost and Cost and Commitment plans are presently shown as straight line estimates of the current year budget allocations. In conjunction with the rebaselining effort, provisional (pending rebaseline approval) FY00 Cost Account Plans (CAPs) are scheduled to be completed by March.

The December 1999 WBS Level 2 variances resulting from actual versus the drafted straight line budget plans are not individually discussed. TPC, TEC, and OPC Cost and Cost and Commitment variances ranging from 6% to 74% of actual below straight lined plans indicate that overall FY00 costs and commitments are well within the current year funds availability. This conservatism is expected to prevail as long as rebaselining efforts are in progress.

National Ignition Facility (NIF) - Project No. 96-D-111

Cumulative-to-Date Project Financial Summary by WBS Level 2 through December 1999 ($K)

WBS Element	Approved Baseline Budget (a)	Planned Commitments to Date	Planned Costs to Date	Current Cost Estimate (b)	Actual Obligations to Date (c)	Actual Commitments to Date	Actual Costs to Date
1.1 Project Office	66,700	65,284	64,730	77,641		73,433	66,181
1.2 Site & Conventional Facilities	213,700	240,842	203,146	246,943		233,659	198,319
1.3 Laser Systems	204,500	97,433	68,814	218,287		112,918	65,672
1.4 Beam Transport System	92,000	129,603	87,698	125,484		109,526	80,787
1.5 Integrated Computer Control	21,600	14,153	13,381	20,608		13,703	13,123
1.6 Optical Components	146,500	50,438	38,613	144,444		47,682	37,740
1.7 Laser Control	72,000	33,462	28,086	75,354		34,070	28,103
1.8 Target Experimental System	68,000	69,118	57,198	82,459		66,397	55,208
1.9 Operations Special Equipment	28,900	31,503	28,657	30,429		27,937	26,542
Subtotal	913,900	731,838	590,325	1,021,650		719,324	571,677
Contingency	131,800			24,050			
Total Estimated Cost (TEC)	1,045,700	731,838	590,325	1,045,700	815,568	719,324	571,677
1.10 Start-up Activities	19,900	5,861	5,861	19,296		5,931	5,920
1.11 ES&H and Supporting R&D	133,300	132,675	131,612	133,904		131,882	130,567
Other Project Cost (OPC)	153,200	138,536	137,473	153,200	145,000	137,813	136,487
Total Project Cost (TPC)	1,198,900	870,374	727,798	1,198,900	960,568	857,137	708,164

(a) Baseline Budget consistent with NIF Project Execution Plan (Appendix D) as of August 1997.

(b) A rebaselining effort is currently in progress which will revise this estimate.

(b) Actual Obligations to Date = cumulative to date NIF Project funds obligated by DOE to Contractors, consistent with actual contract modifications.

National Ignition Facility (NIF) - Project No. 96-D-111

Cumulative-to-Date Project Financial Summary by Participant through December 1999 ($K)

Project Participant	Baseline Budget (a)	Planned Commitments to Date	Planned Costs to Date	Current Estimate (b)	Actual Obligations to Date (c)	Actual Commitments to Date	Actual Costs to Date
LLNL TEC	887,380	704,424	563,204	993,632	784,114	692,091	544,491
SNL TEC	21,536	19,622	19,497	22,156	22,308	19,596	19,548
LANL TEC	4,984	7,671	7,502	5,862	8,755	7,637	7,637
LLE TEC	-	121	121	-	390	-	-
Subtotal TEC	913,900	731,838	590,325	1,021,650	815,568	719,324	571,677
Contingency TEC	131,800			24,050			
Total Estimated Cost (TEC)	1,045,700	731,838	590,325	1,045,700	815,568	719,324	571,677
LLNL OPC	146,480	131,328	130,265	145,822	137,626	130,637	129,311
SNL OPC	2,250	2,250	2,250	2,250	2,250	2,250	2,250
LANL OPC	1,895	1,894	1,894	1,893	1,895	1,894	1,894
LLE OPC	360	474	474	568	510	460	460
ANL OPC	2,099	2,472	2,472	2,550	2,600	2,455	2,455
NV OPC	116	117	117	117	119	117	117
Other OPC (d)	-	-	-	-	-	-	-
Other Project Cost (OPC)	153,200	138,536	137,473	153,200	145,000	137,813	136,487
LLNL TPC	1,033,860	835,752	693,469	1,139,454	921,740	822,728	673,803
SNL TPC	23,786	21,872	21,747	24,406	24,558	21,846	21,798
LANL TPC	6,879	9,566	9,397	7,755	10,650	9,531	9,531
LLE TPC	360	595	595	568	510	460	460
ANL TPC	2,099	2,472	2,472	2,550	2,600	2,455	2,455
NV TPC	116	117	117	117	119	117	117
Other TPC (d)	-	-	-	-	390	-	-
Subtotal TPC	1,067,100	870,374	727,798	1,174,850	960,568	857,137	708,164
Contingency TPC	131,800			24,050			
Total Project Cost (TPC)	1,198,900	870,374	727,798	1,198,900	960,568	857,137	708,164

(a) Baseline Budget consistent with NIF Project Execution Plan (Appendix D) as of August 1997.

(b) A rebaselining effort is currently in progress which will revise this estimate.

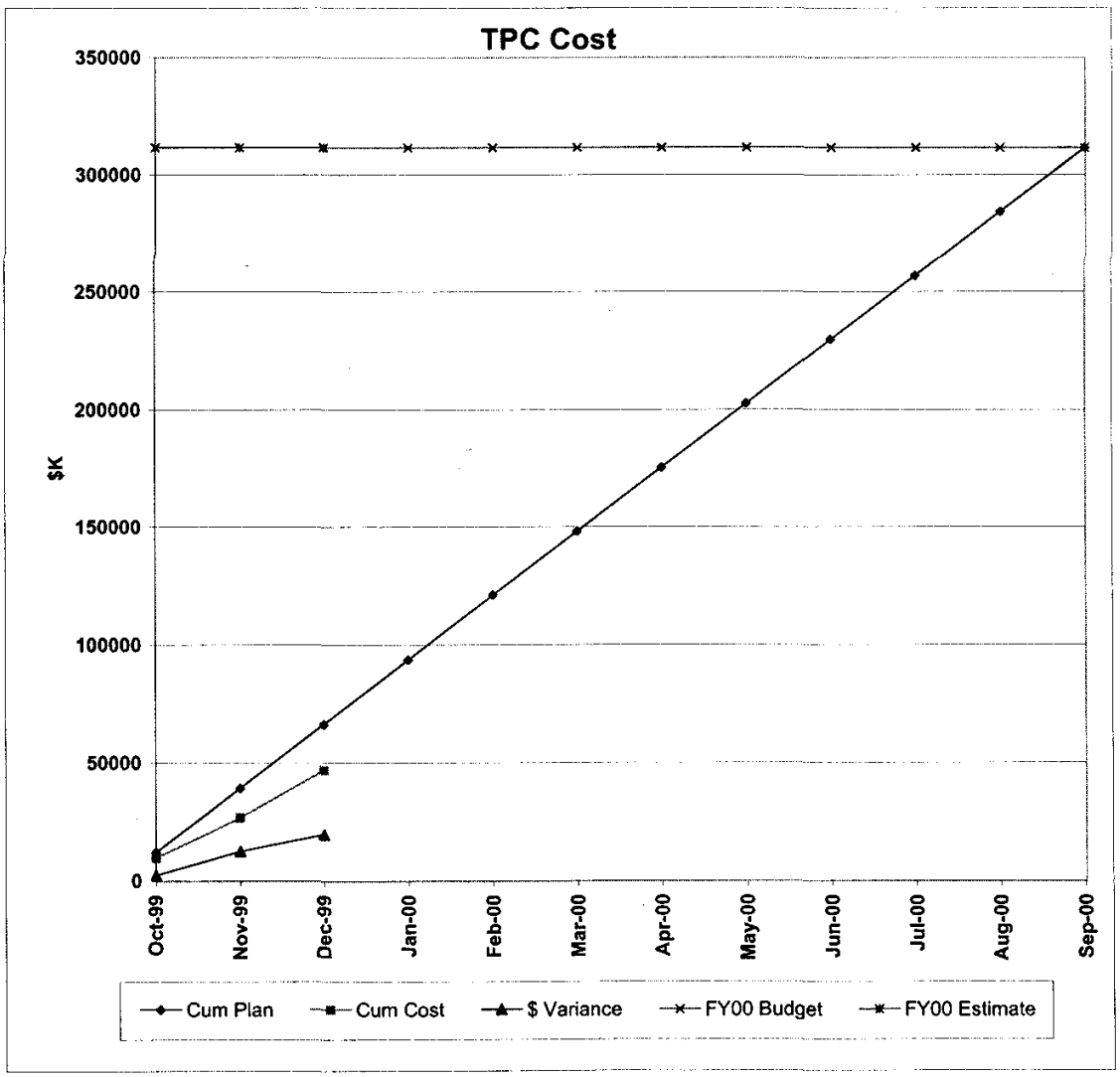
(c) Actual Obligations to Date = cumulative to date NIF Project funds obligated by DOE to Contractors, consistent with actual contract modifications.

(d) Carryover WFO/DOE OPEX at OAK ($3,048) is shown in the participant (LANL and NV) OPEX balances.

FY2000 Cost Plan to Actual
as of December 1999
Total Project Cost (TPC) ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	12,057	9,690	12,057	9,690	2,367	20%	311,520	311,520
Nov-99	27,224	17,043	39,281	26,733	12,548	32%	311,520	311,520
Dec-99	27,224	20,136	66,505	46,870	19,635	30%	311,520	311,520
Jan-00	27,224		93,729				311,520	
Feb-00	27,224		120,953				311,520	
Mar-00	27,224		148,176				311,520	
Apr-00	27,224		175,400				311,520	
May-00	27,224		202,624				311,520	
Jun-00	27,224		229,848				311,520	
Jul-00	27,224		257,072				311,520	
Aug-00	27,224		284,296				311,520	
Sep-00	27,224		311,520				311,520	

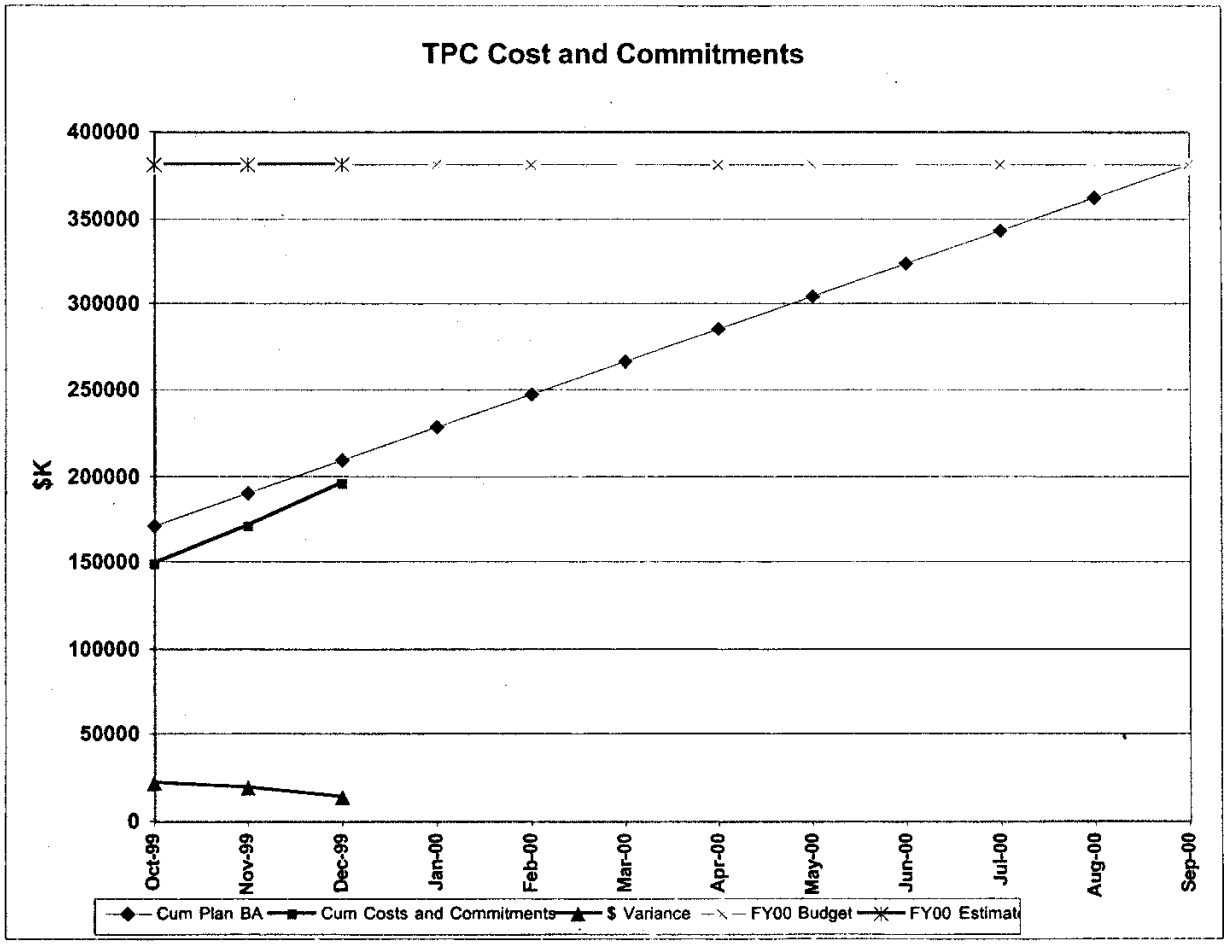


* Rebaselining in progress will establish Project TPC BAC/EAC.

FY2000 Plan to Actual as of December 1999
Total Project Cost (TPC) - Cost and Commitments ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	171,009 * *	149,362	171,009 * *	149,362	21,647	13%	380,409	380,409
Nov-99	19,036	21,090	190,045	170,452	19,593	10%	380,409	380,409
Dec-99	19,036	25,391	209,082	195,843	13,239	6%	380,409	380,409
Jan-00	19,036		228,118				380,409	
Feb-00	19,036		247,155				380,409	
Mar-00	19,036		266,191				380,409	
Apr-00	19,036		285,227				380,409	
May-00	19,036		304,264				380,409	
Jun-00	19,036		323,300				380,409	
Jul-00	19,036		342,337				380,409	
Aug-00	19,036		361,373				380,409	
Sep-00	19,036		380,409				380,409	

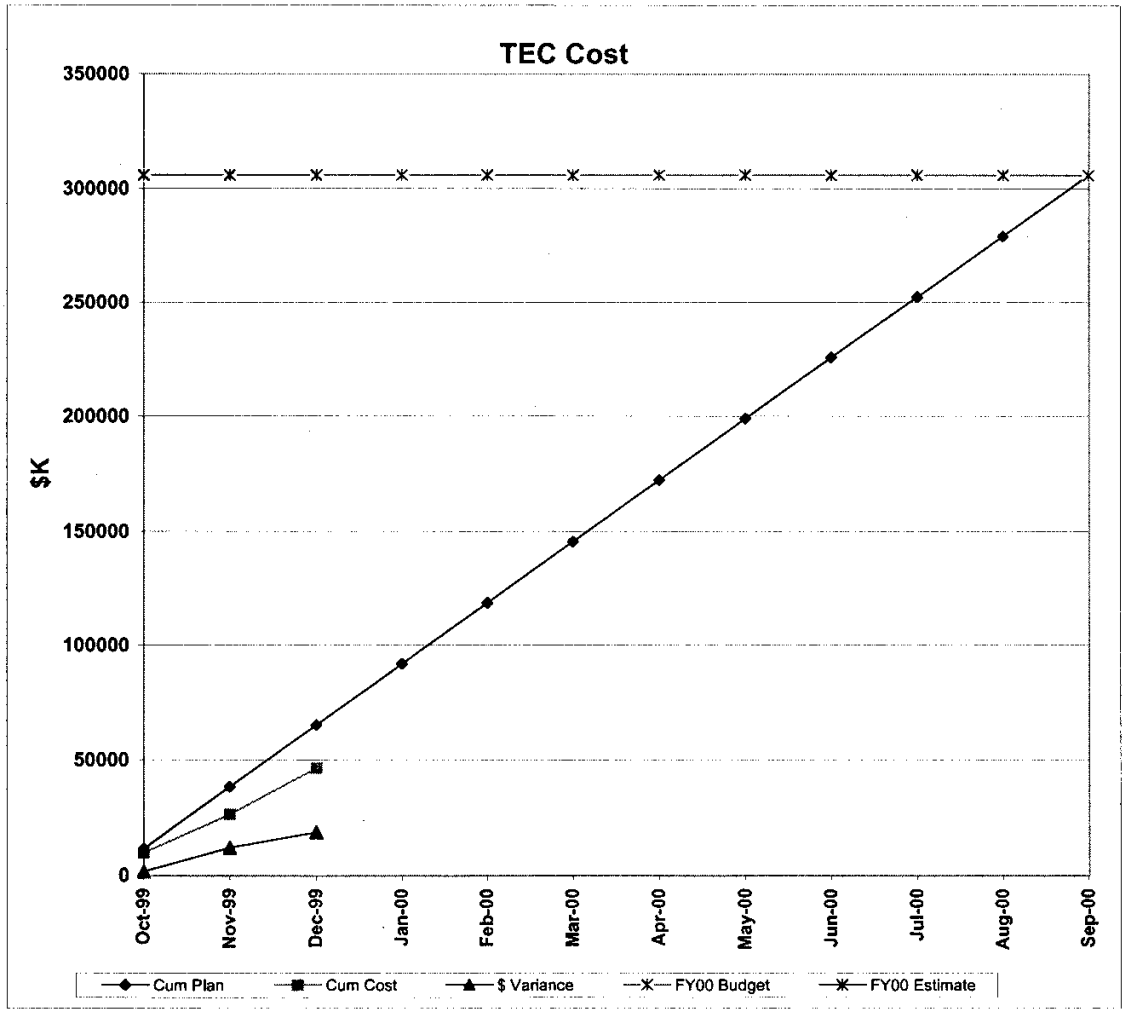


* Rebaselining in progress will establish Project TPC BAC/EAC.
** Includes $97,684K of uncosted obligations from FY99.

FY2000 Cost Plan to Actual
as of December 1999
Total Estimated Cost (TEC) ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	11,647	9,826	11,647	9,826	1,821	16%	306,054	306,054
Nov-99	26,764	16,570	38,411	26,395	12,016	31%	306,054	306,054
Dec-99	26,764	20,132	65,176	46,528	18,648	29%	306,054	306,054
Jan-00	26,764		91,940				306,054	
Feb-00	26,764		118,704				306,054	
Mar-00	26,764		145,468				306,054	
Apr-00	26,764		172,233				306,054	
May-00	26,764		198,997				306,054	
Jun-00	26,764		225,761				306,054	
Jul-00	26,764		252,526				306,054	
Aug-00	26,764		279,290				306,054	
Sep-00	26,764		306,054				306,054	

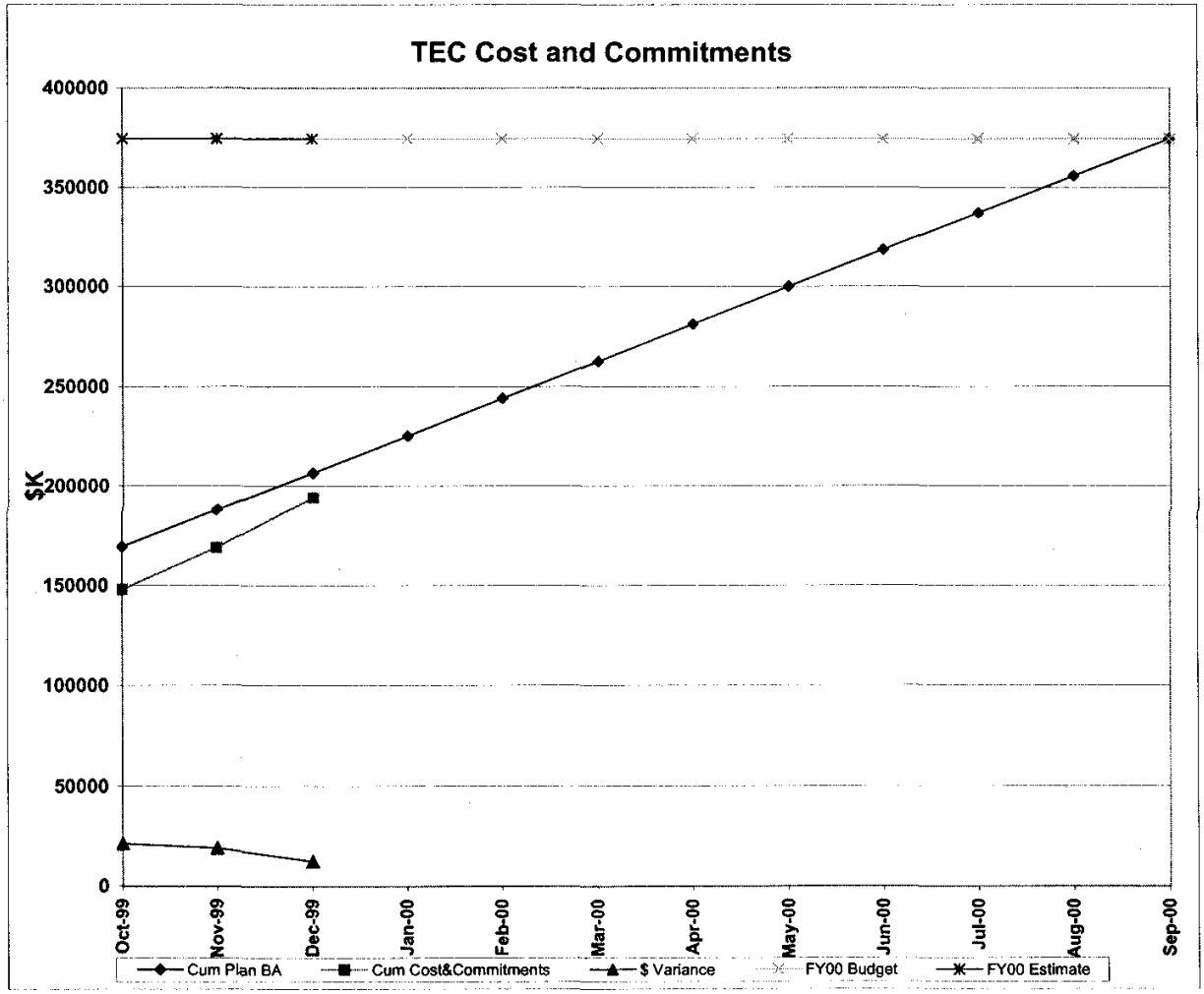


* Rebaselining in progress will establish Project TEC BAC/EAC.

FY2000 Plan to Actual as of December 1999
Total Estimated Cost (TEC) - Cost and Commitments ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-98	169,417 **	148,023	169,417 **	148,023	21,394	13%	374,416	374,416
Nov-98	18,636	20,837	188,053	168,860	19,194	10%	374,416	374,416
Dec-98	18,636	25,315	206,690	194,175	12,515	6%	374,416	374,416
Jan-99	18,636		225,326				374,416	
Feb-99	18,636		243,962				374,416	
Mar-99	18,636		262,599				374,416	
Apr-99	18,636		281,235				374,416	
May-99	18,636		299,871				374,416	
Jun-99	18,636		318,507				374,416	
Jul-99	18,636		337,144				374,416	
Aug-99	18,636		355,780				374,416	
Sep-99	18,636		374,416				374,416	



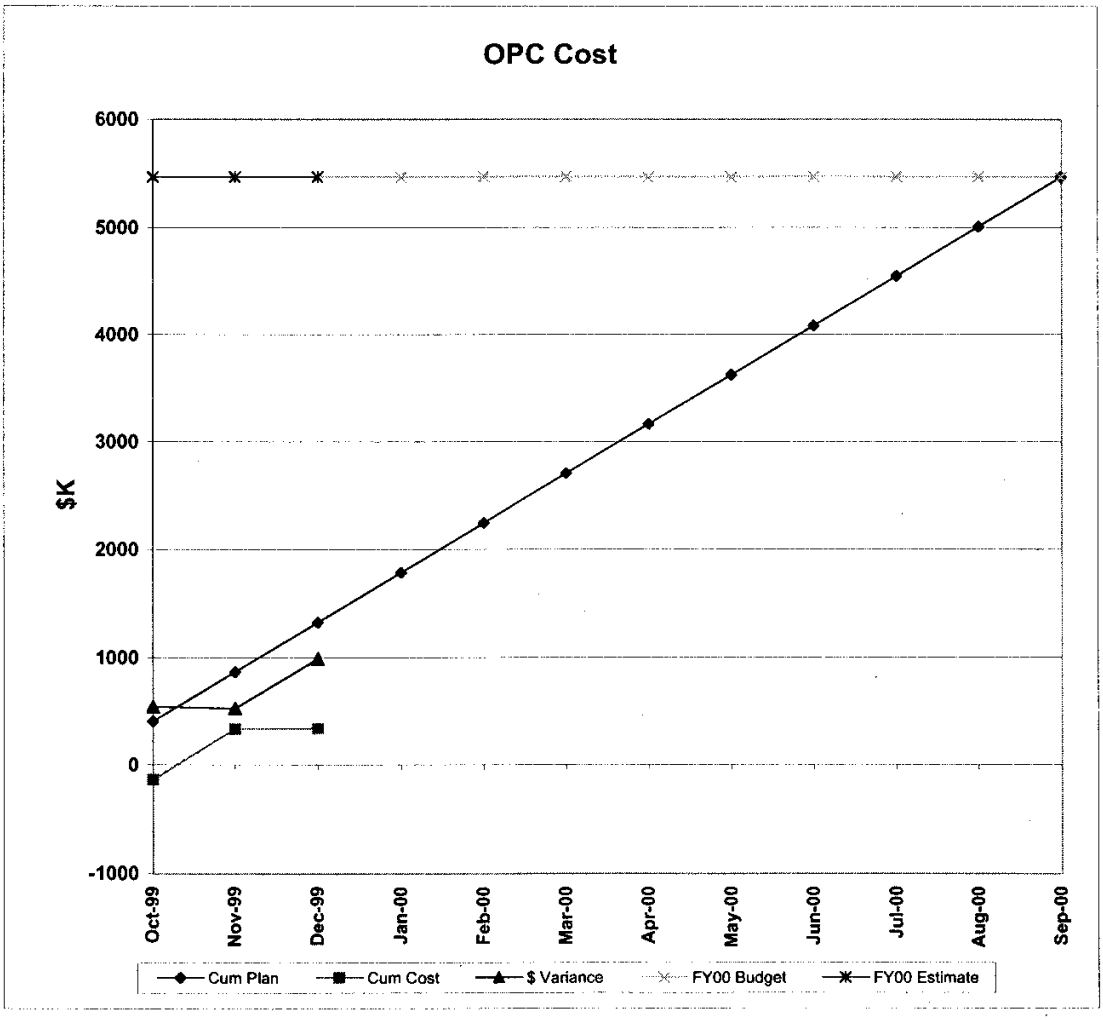
* Rebaselining in progress will establish Project TEC BAC/EAC.

** Includes $87,940K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
Other Project Cost (OPC) ($K)

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget *	Estimate *
Oct-99	410	-135	410	-135	545	133%	5,466	5,466
Nov-99	460	474	870	338	531	61%	5,466	5,466
Dec-99	460	4	1,329	342	987	74%	5,466	5,466
Jan-00	460		1,789				5,466	
Feb-00	460		2,248				5,466	
Mar-00	460		2,708				5,466	
Apr-00	460		3,168				5,466	
May-00	460		3,627				5,466	
Jun-00	460		4,087				5,466	
Jul-00	460		4,546				5,466	
Aug-00	460		5,006				5,466	
Sep-00	460		5,466				5,466	

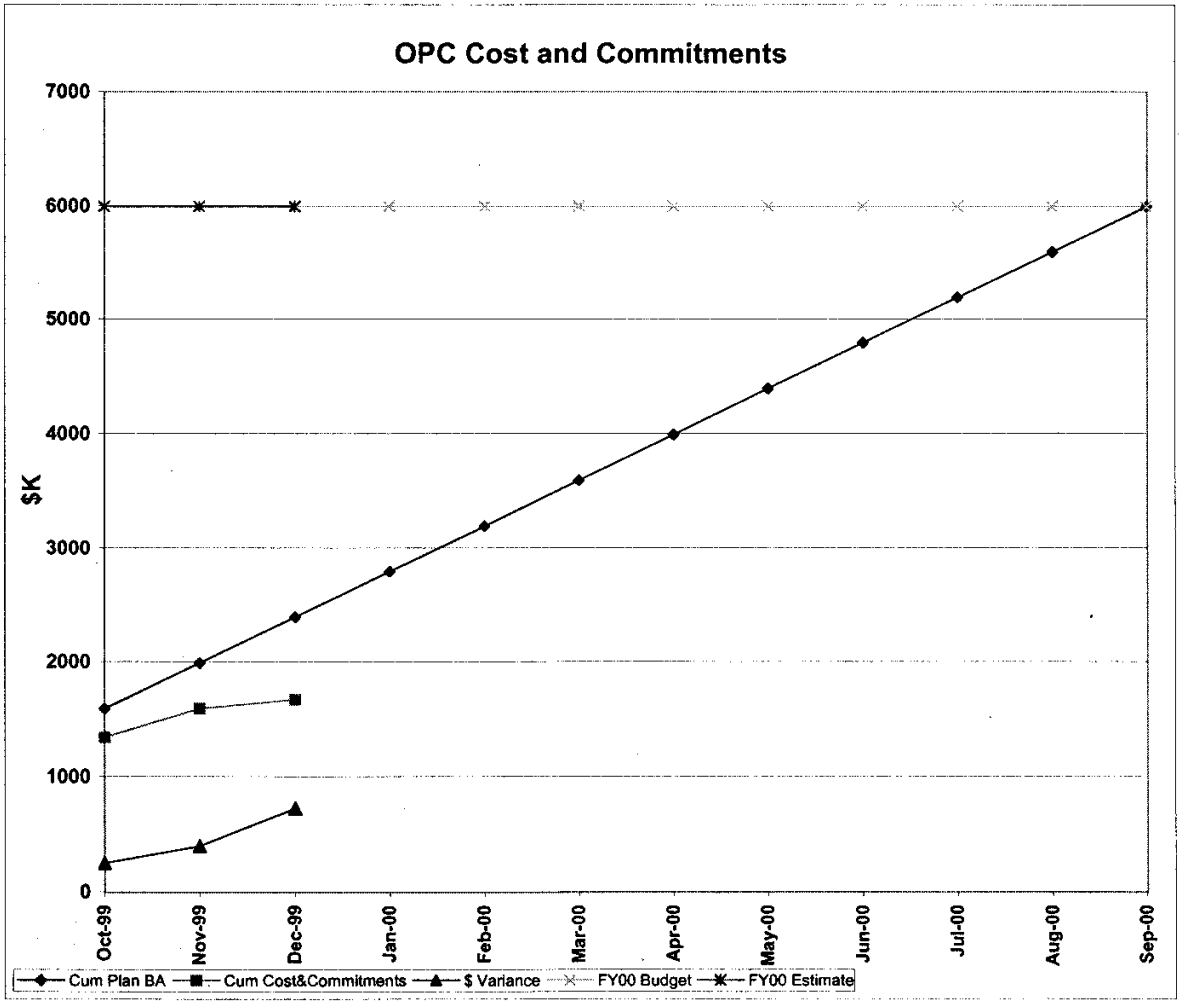


* Rebaselining in progress will establish Project OPC BAC/EAC.

FY2000 Plan to Actual as of December 1999
Other Project Cost (OPC) - Cost and Commitments ($K)

Project Number 96-D-111
December 1999

Month	Monthly Planned	Monthly Actual	Cumulative Planned	Cumulative Actual	Cumulative $ Var	Cumulative % Var	FY2000 Budget *	FY2000 Estimate *
Oct-99	1,592 **	1,339	1,592 **	1,339	253	16%	5,993	5,993
Nov-99	400	253	1,992	1,592	400	20%	5,993	5,993
Dec-99	400	75	2,392	1,668	724	30%	5,993	5,993
Jan-00	400						5,993	
Feb-00	400						5,993	
Mar-00	400						5,993	
Apr-00	400						5,993	
May-00	400						5,993	
Jun-00	400						5,993	
Jul-00	400						5,993	
Aug-00	400						5,993	
Sep-00	400						5,993	



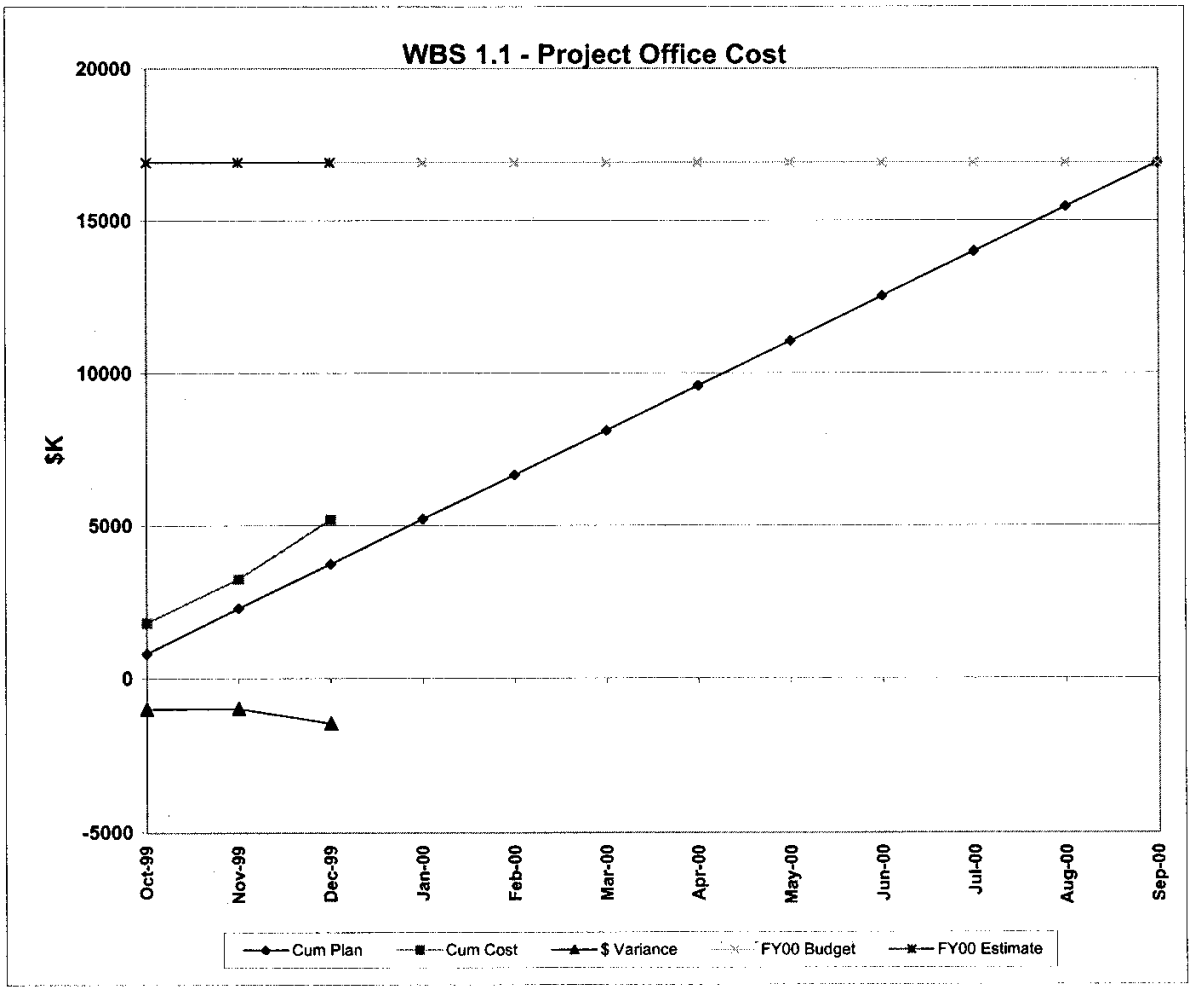
* Rebaselining in progress will establish Project OPC BAC/EAC.

** Includes $9,745K of uncosted obligations from FY99.

FY2000 Cost Plan to Actual as of December 1999
WBS 1.1 - Project Office ($K)

Project Number 96-D-111
December 1999

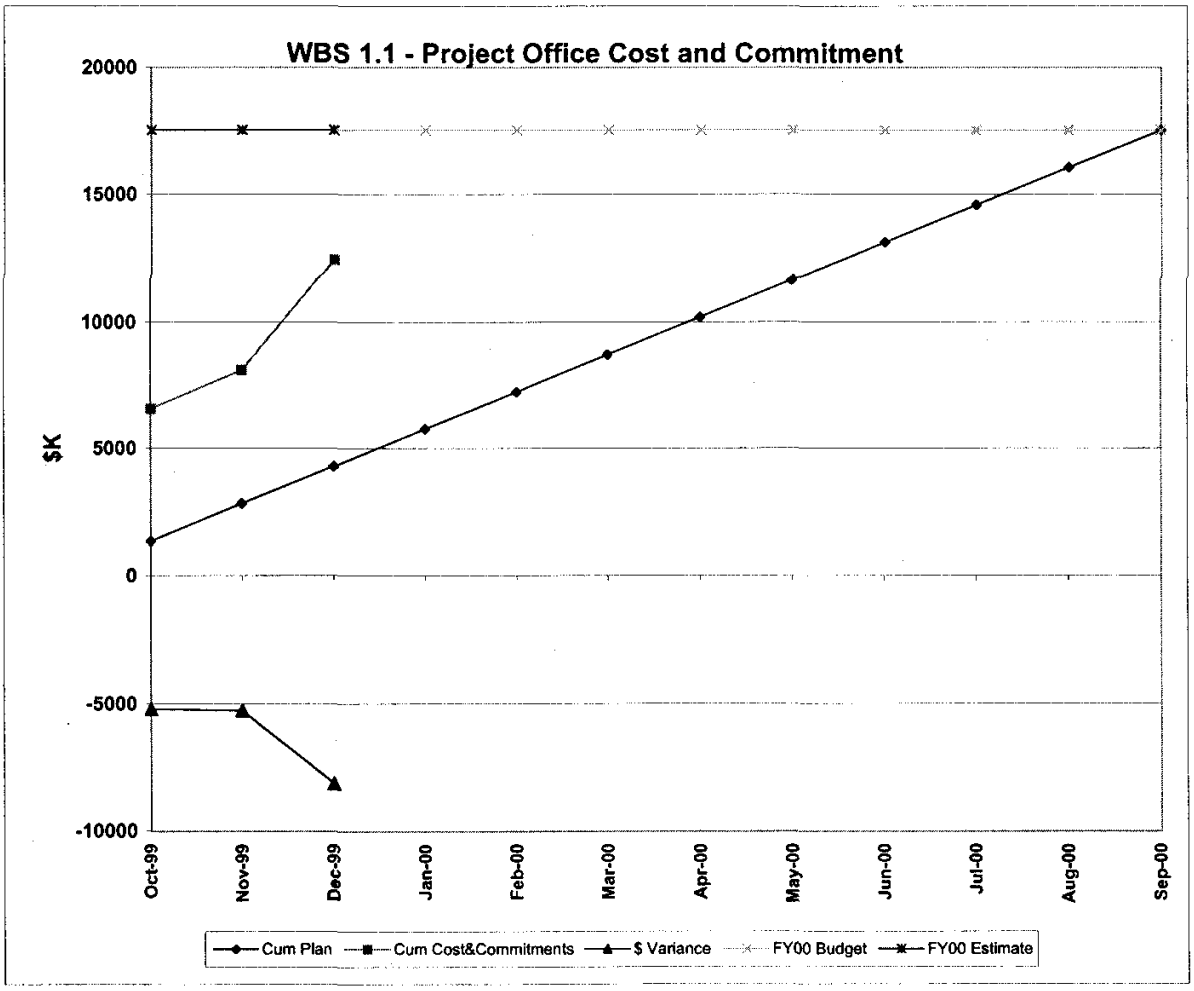
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	821	1,812	821	1,812	-991	-121%	16,907	16,907
Nov-98	1,462	1,442	2,283	3,254	-970	-42%	16,907	16,907
Dec-98	1,462	1,943	3,746	5,197	-1,451	-39%	16,907	16,907
Jan-99	1,462		5,208				16,907	
Feb-99	1,462		6,671				16,907	
Mar-99	1,462		8,133				16,907	
Apr-99	1,462		9,595				16,907	
May-99	1,462		11,058				16,907	
Jun-99	1,462		12,520				16,907	
Jul-99	1,462		13,983				16,907	
Aug-99	1,462		15,445				16,907	
Sep-99	1,462		16,907				16,907	



FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.1 - Project Office ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	1,358 *	6,571	1,358 *	6,571	-5,213	-384%	17,537	17,537
Nov-98	1,471	1,531	2,829	8,103	-5,274	-186%	17,537	17,537
Dec-98	1,471	4,346	4,300	12,449	-8,149	-190%	17,537	17,537
Jan-99	1,471		5,770				17,537	
Feb-99	1,471		7,241				17,537	
Mar-99	1,471		8,712				17,537	
Apr-99	1,471		10,183				17,537	
May-99	1,471		11,654				17,537	
Jun-99	1,471		13,124				17,537	
Jul-99	1,471		14,595				17,537	
Aug-99	1,471		16,066				17,537	
Sep-99	1,471		17,537				17,537	

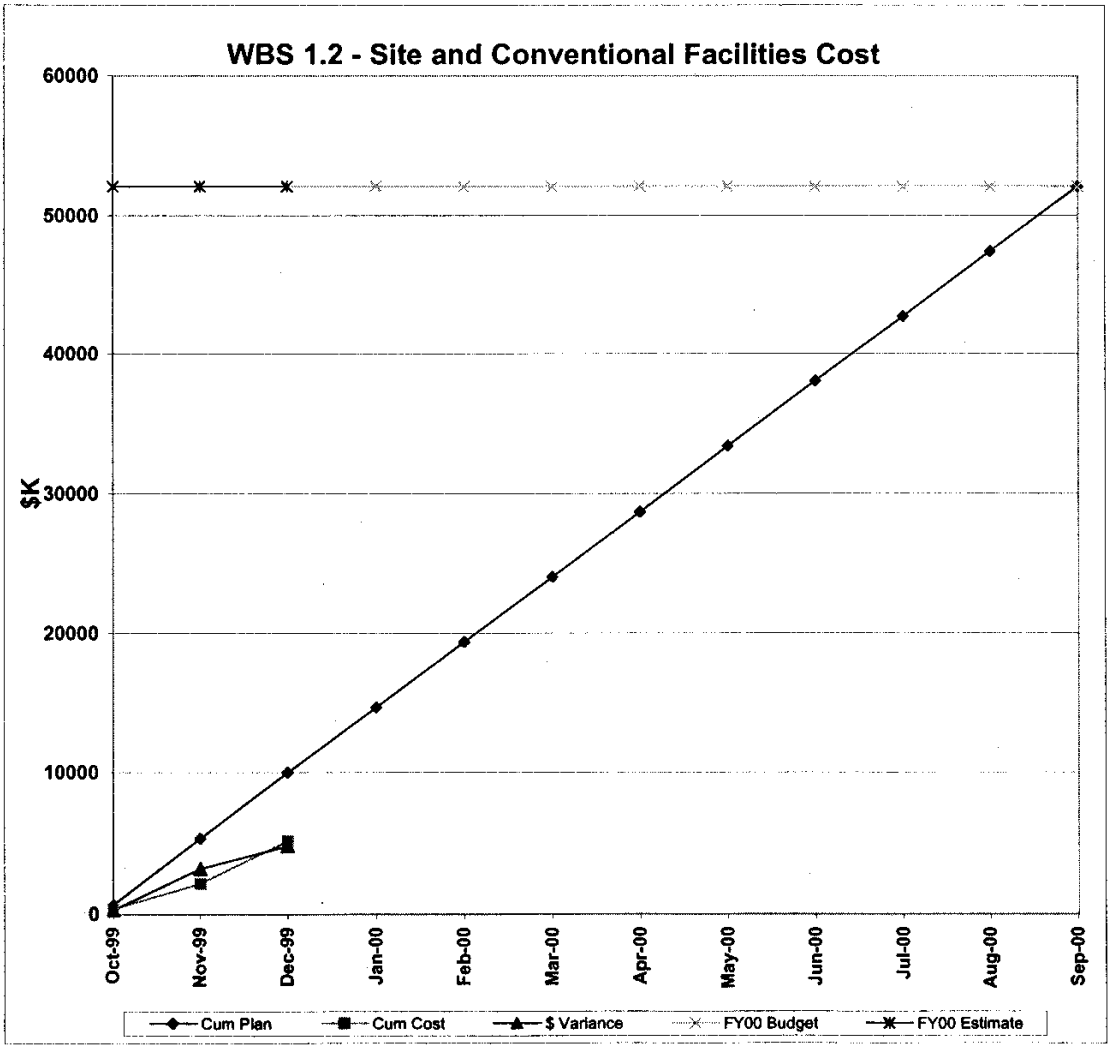


* Includes $4,263K of uncosted obligations from FY99.

FY2000 Cost Plan to Actual as of December 1999
WBS 1.2 - Site and Conventional Facilities ($K)

Project Number 96-D-111
December 1999

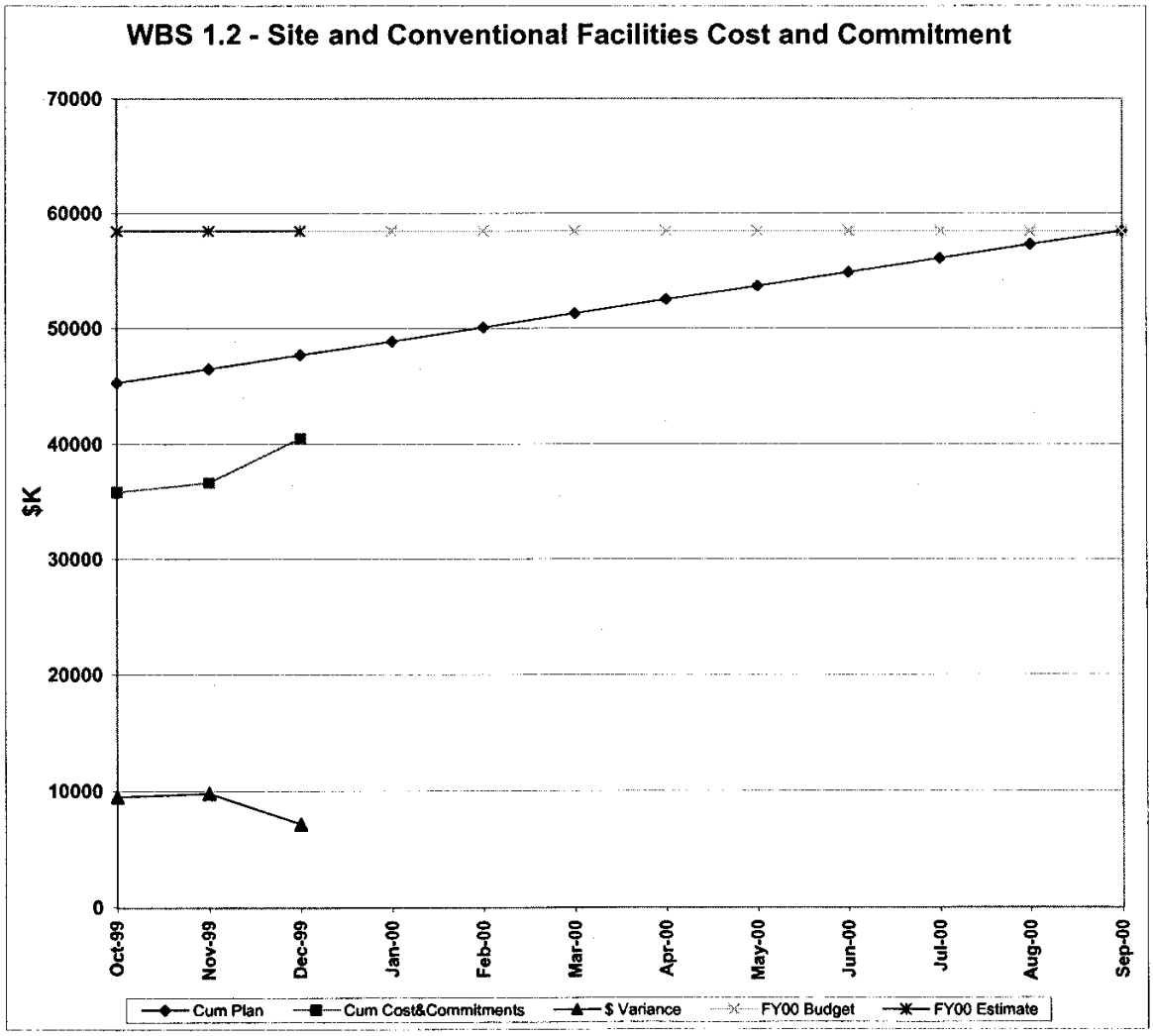
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	664	363	664	363	301	45%	52,090	52,090
Nov-98	4,675	1,767	5,339	2,130	3,209	60%	52,090	52,090
Dec-98	4,675	3,057	10,014	5,187	4,827	48%	52,090	52,090
Jan-99	4,675		14,689				52,090	
Feb-99	4,675		19,364				52,090	
Mar-99	4,675		24,040				52,090	
Apr-99	4,675		28,715				52,090	
May-99	4,675		33,390				52,090	
Jun-99	4,675		38,065				52,090	
Jul-99	4,675		42,740				52,090	
Aug-99	4,675		47,415				52,090	
Sep-99	4,675		52,090				52,090	



FY2000 Cost and Commitment Plan to Actual as of December 1999
WBS 1.2 - Site and Conventional Facilities ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	45,320 *	35,825	45,320 *	35,825	9,495	21%	58,466	58,466
Nov-98	1,195	860	46,515	36,685	9,830	21%	58,466	58,466
Dec-98	1,195	3,842	47,710	40,527	7,184	15%	58,466	58,466
Jan-99	1,195		48,905				58,466	
Feb-99	1,195		50,100				58,466	
Mar-99	1,195		51,296				58,466	
Apr-99	1,195		52,491				58,466	
May-99	1,195		53,686				58,466	
Jun-99	1,195		54,881				58,466	
Jul-99	1,195		56,076				58,466	
Aug-99	1,195		57,271				58,466	
Sep-99	1,195		58,466				58,466	

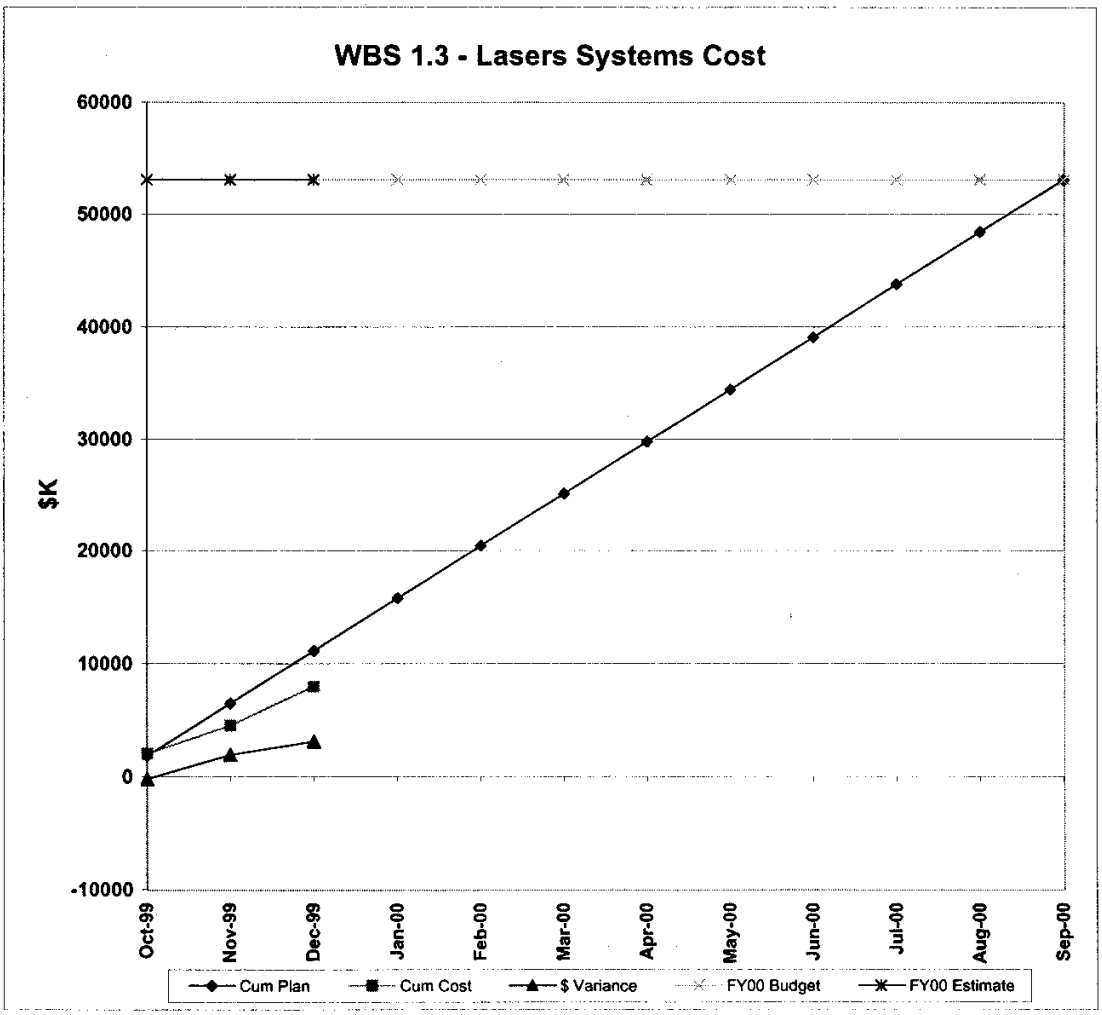


* Includes $34,968K of uncosted obligations from FY99.

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.3 - Lasers Systems ($K)

Project Number 96-D-111
December 1999

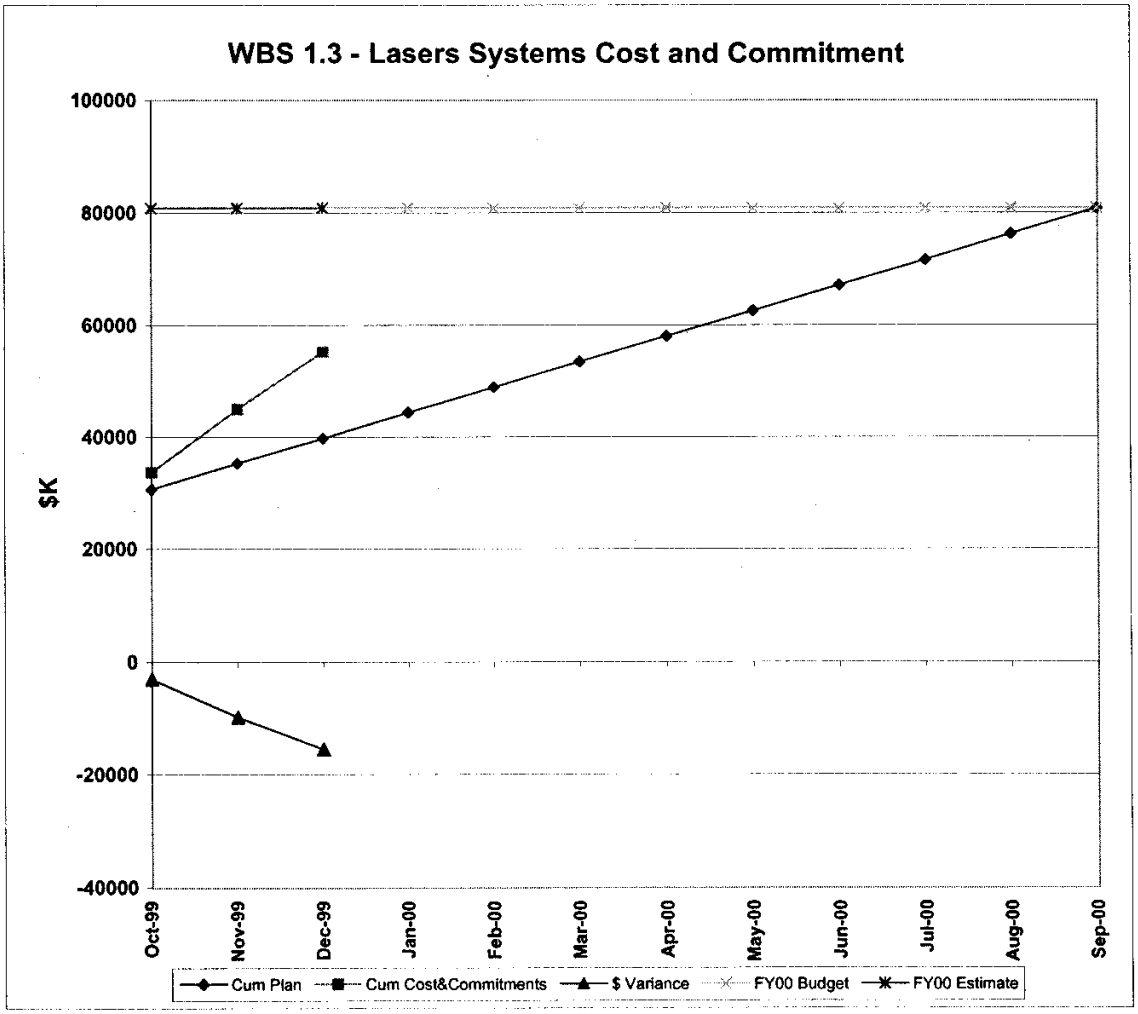
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	1,849	2,050	1,849	2,050	-201	-11%	53,083	53,083
Nov-98	4,658	2,517	6,507	4,567	1,939	30%	53,083	53,083
Dec-98	4,658	3,455	11,164	8,023	3,142	28%	53,083	53,083
Jan-99	4,658		15,822				53,083	
Feb-99	4,658		20,479				53,083	
Mar-99	4,658		25,137				53,083	
Apr-99	4,658		29,795				53,083	
May-99	4,658		34,452				53,083	
Jun-99	4,658		39,110				53,083	
Jul-99	4,658		43,767				53,083	
Aug-99	4,658		48,425				53,083	
Sep-99	4,658		53,083				53,083	



FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.3 - Lasers Systems ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-98	30,661 *	33,683	30,661 *	33,683	-3,022	-10%	80,840	80,840
Nov-98	4,562	11,269	35,223	44,952	-9,729	-28%	80,840	80,840
Dec-98	4,562	10,316	39,784	55,268	-15,484	-39%	80,840	80,840
Jan-99	4,562		44,346				80,840	
Feb-99	4,562		48,908				80,840	
Mar-99	4,562		53,470				80,840	
Apr-99	4,562		58,031				80,840	
May-99	4,562		62,593				80,840	
Jun-99	4,562		67,155				80,840	
Jul-99	4,562		71,716				80,840	
Aug-99	4,562		76,278				80,840	
Sep-99	4,562		80,840				80,840	

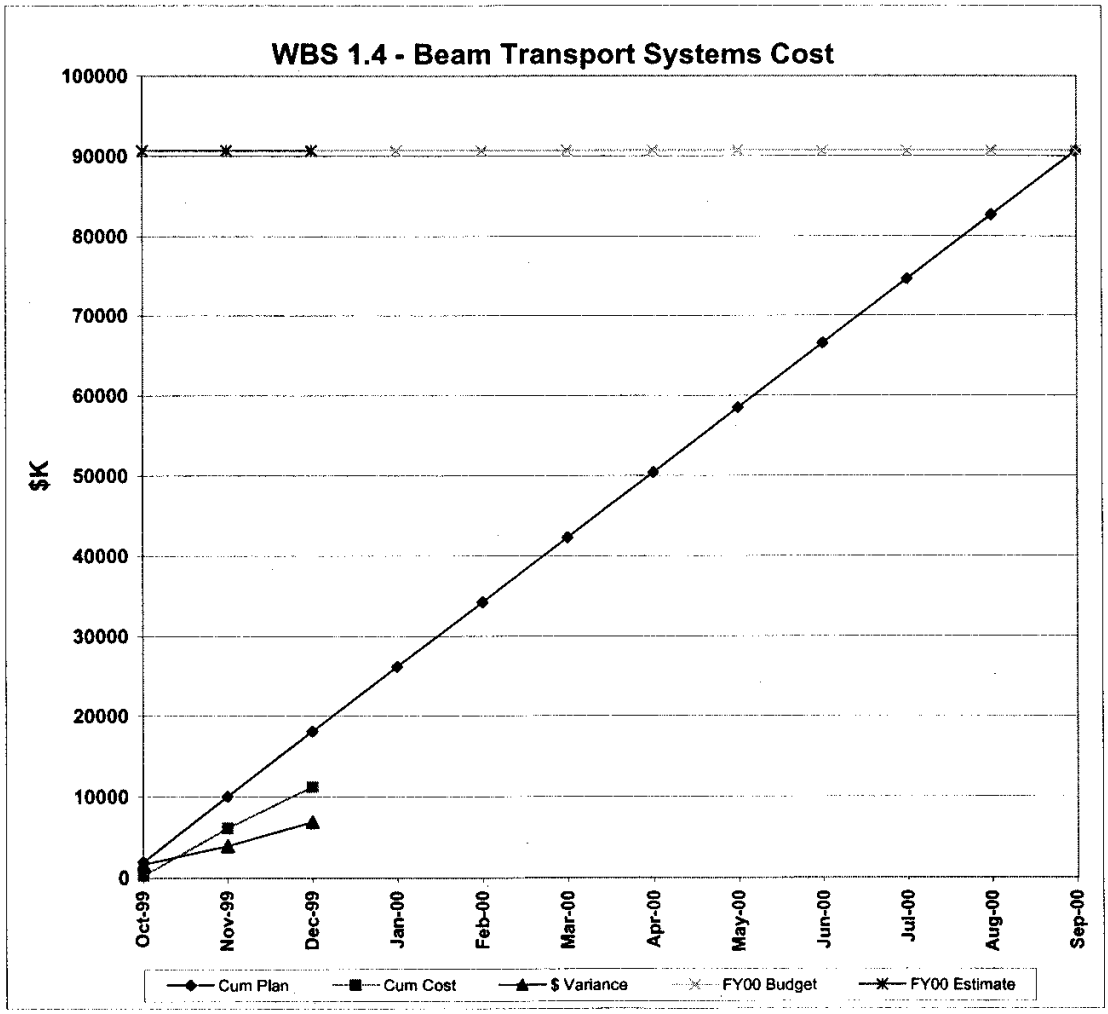


* Includes $25,645K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.4 - Beam Transport Systems($K)

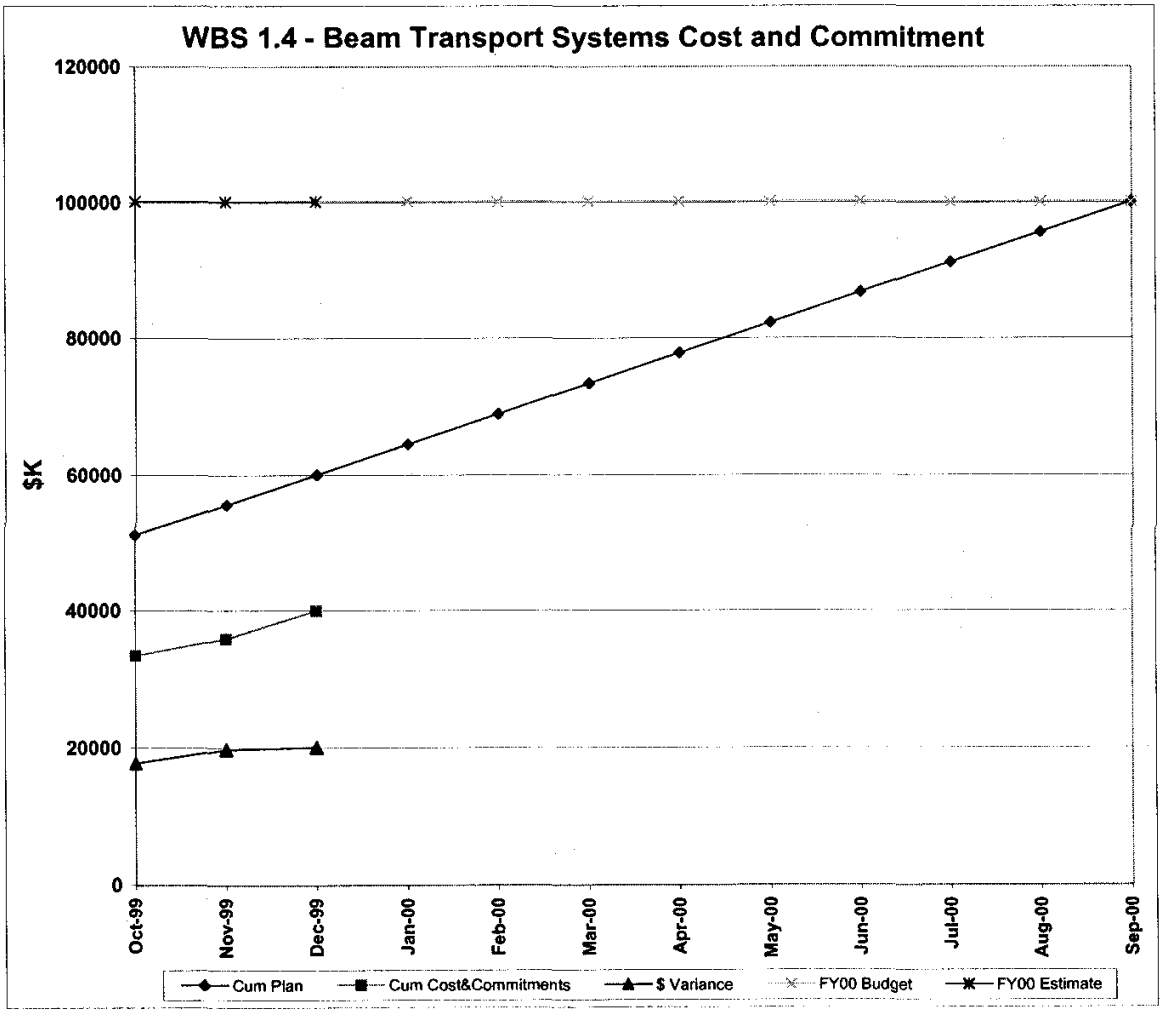
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,993	312	1,993	312	1,681	84%	90,764	90,764
Nov-99	8,070	5,793	10,063	6,106	3,957	39%	90,764	90,764
Dec-99	8,070	5,116	18,133	11,222	6,912	38%	90,764	90,764
Jan-00	8,070		26,203				90,764	
Feb-00	8,070		34,273				90,764	
Mar-00	8,070		42,344				90,764	
Apr-00	8,070		50,414				90,764	
May-00	8,070		58,484				90,764	
Jun-00	8,070		66,554				90,764	
Jul-00	8,070		74,624				90,764	
Aug-00	8,070		82,694				90,764	
Sep-00	8,070		90,764				90,764	



FY2000 Cost and Commitment Plan to Actual as of December 1999
WBS 1.4 - BeamTransport Systems ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	51,134 *	33,394	51,134 *	33,394	17,740	35%	100,106	100,106
Nov-99	4,452	2,457	55,586	35,850	19,736	36%	100,106	100,106
Dec-99	4,452	4,109	60,038	39,960	20,078	33%	100,106	100,106
Jan-00	4,452		64,490				100,106	
Feb-00	4,452		68,942				100,106	
Mar-00	4,452		73,394				100,106	
Apr-00	4,452		77,846				100,106	
May-00	4,452		82,298				100,106	
Jun-00	4,452		86,750				100,106	
Jul-00	4,452		91,202				100,106	
Aug-00	4,452		95,654				100,106	
Sep-00	4,452		100,106				100,106	

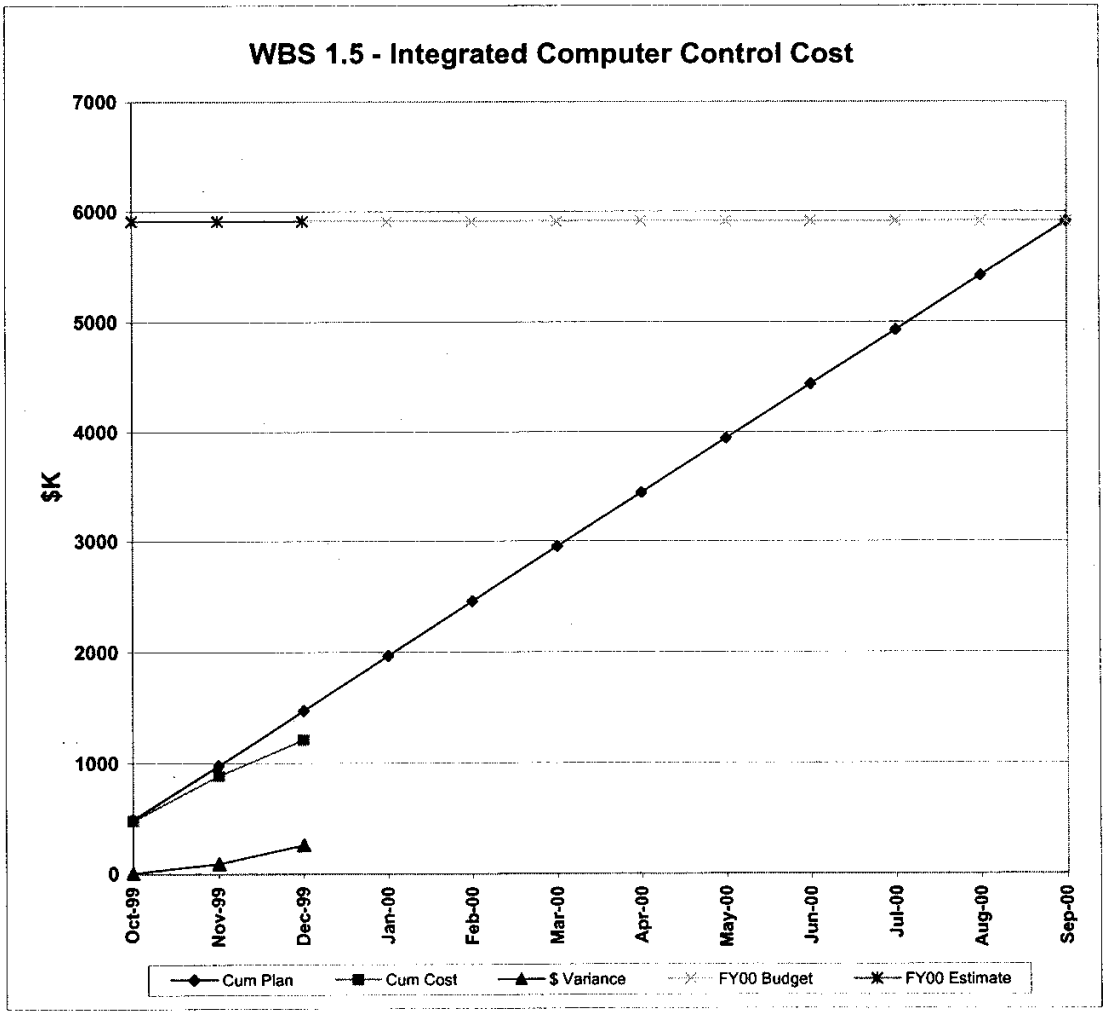


* Includes $34,782K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.5 - Integrated Computer Control ($K)

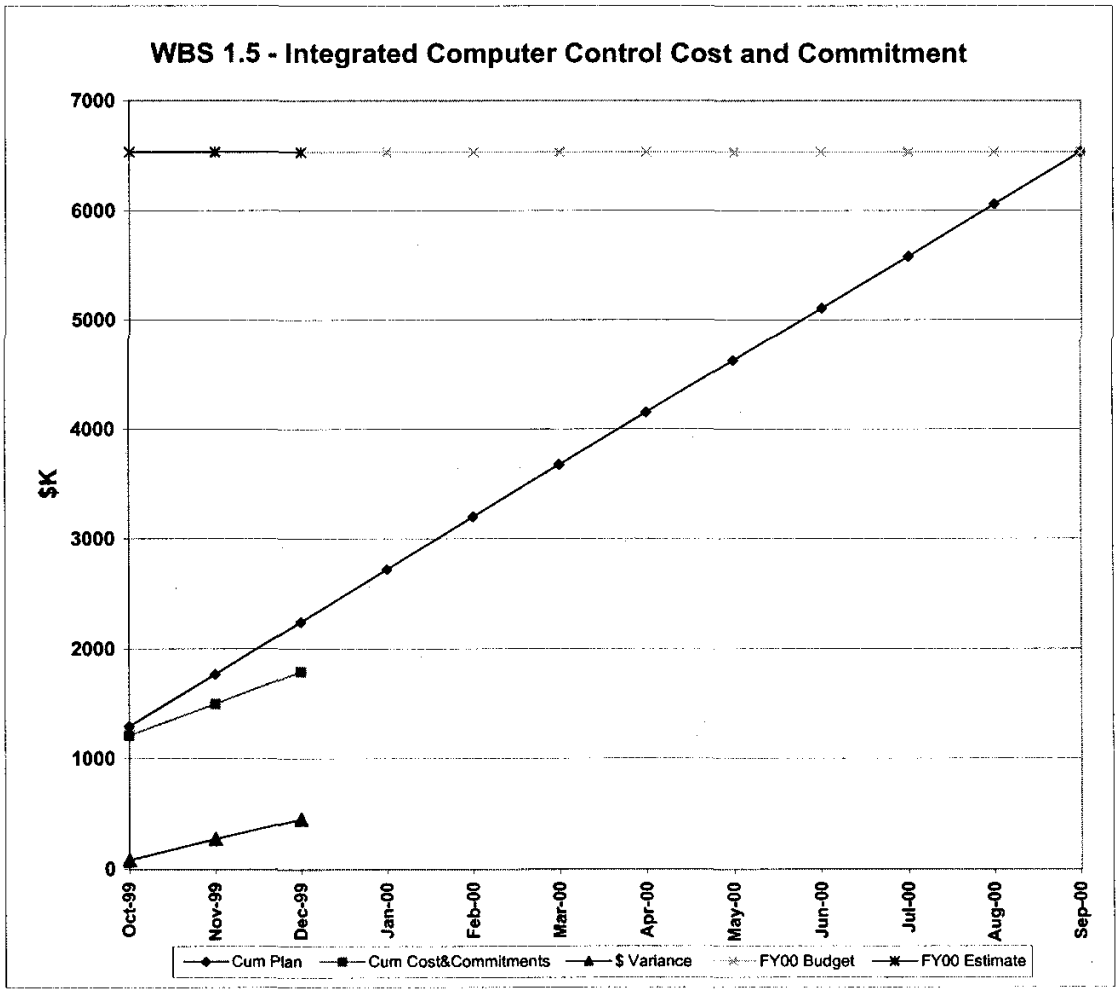
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	489	482	489	482	7	1%	5,914	5,914
Nov-99	493	407	982	889	93	10%	5,914	5,914
Dec-99	493	328	1,475	1,217	258	17%	5,914	5,914
Jan-00	493		1,969				5,914	
Feb-00	493		2,462				5,914	
Mar-00	493		2,955				5,914	
Apr-00	493		3,448				5,914	
May-00	493		3,941				5,914	
Jun-00	493		4,435				5,914	
Jul-00	493		4,928				5,914	
Aug-00	493		5,421				5,914	
Sep-00	493		5,914				5,914	



Project Number 96-D-111
December 1999

FY2000 Cost and Commitment Plan to Actual as of December 1999 WBS 1.5 - Integrated Computer Control ($K)

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,294 *	1,211	1,294 *	1,211	83	6%	6,536	6,536
Nov-99	477	287	1,771	1,498	273	15%	6,536	6,536
Dec-99	477	299	2,247	1,797	450	20%	6,536	6,536
Jan-00	477		2,724				6,536	
Feb-00	477		3,200				6,536	
Mar-00	477		3,677				6,536	
Apr-00	477		4,153				6,536	
May-00	477		4,630				6,536	
Jun-00	477		5,106				6,536	
Jul-00	477		5,583				6,536	
Aug-00	477		6,059				6,536	
Sep-00	477		6,536				6,536	

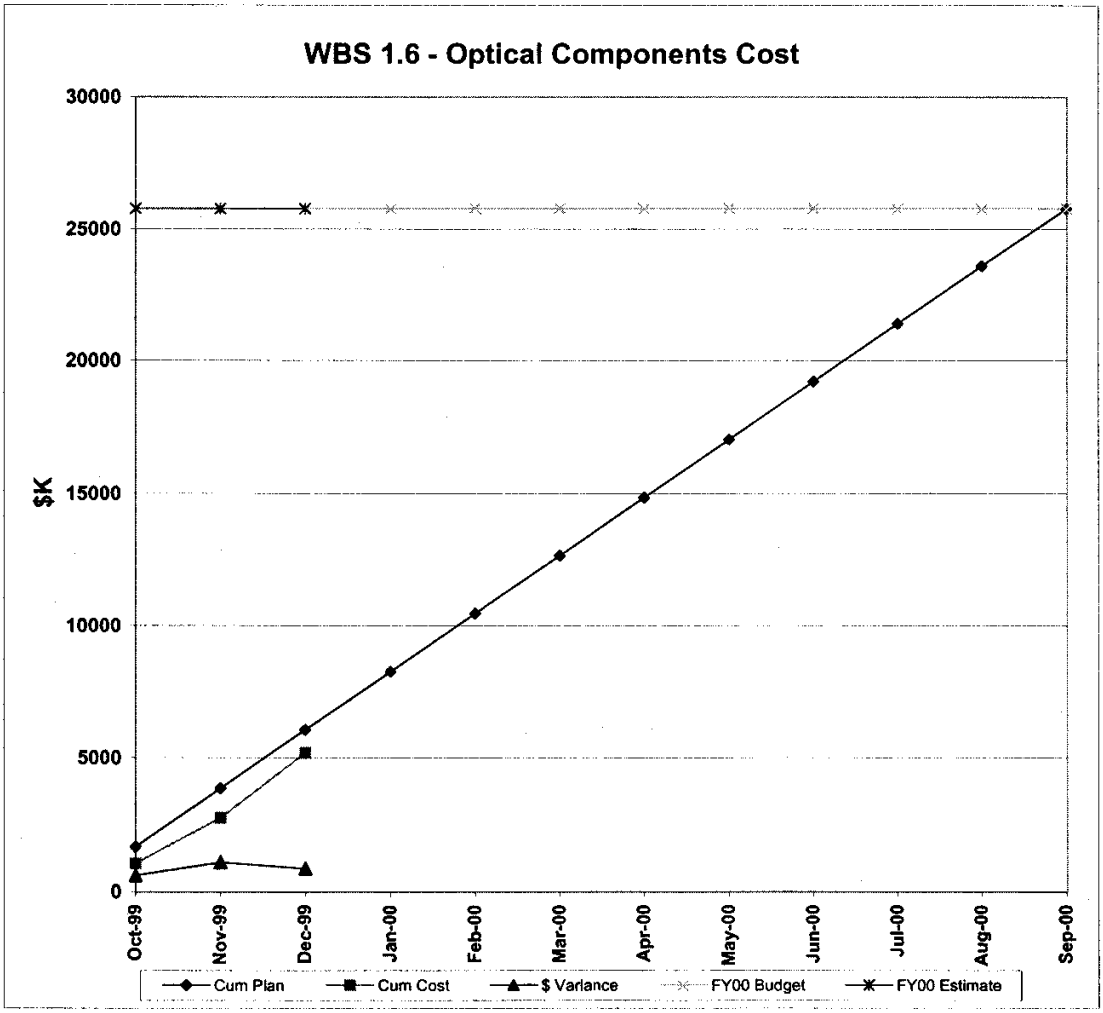


* Includes $750K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.6 - Optical Components ($K)

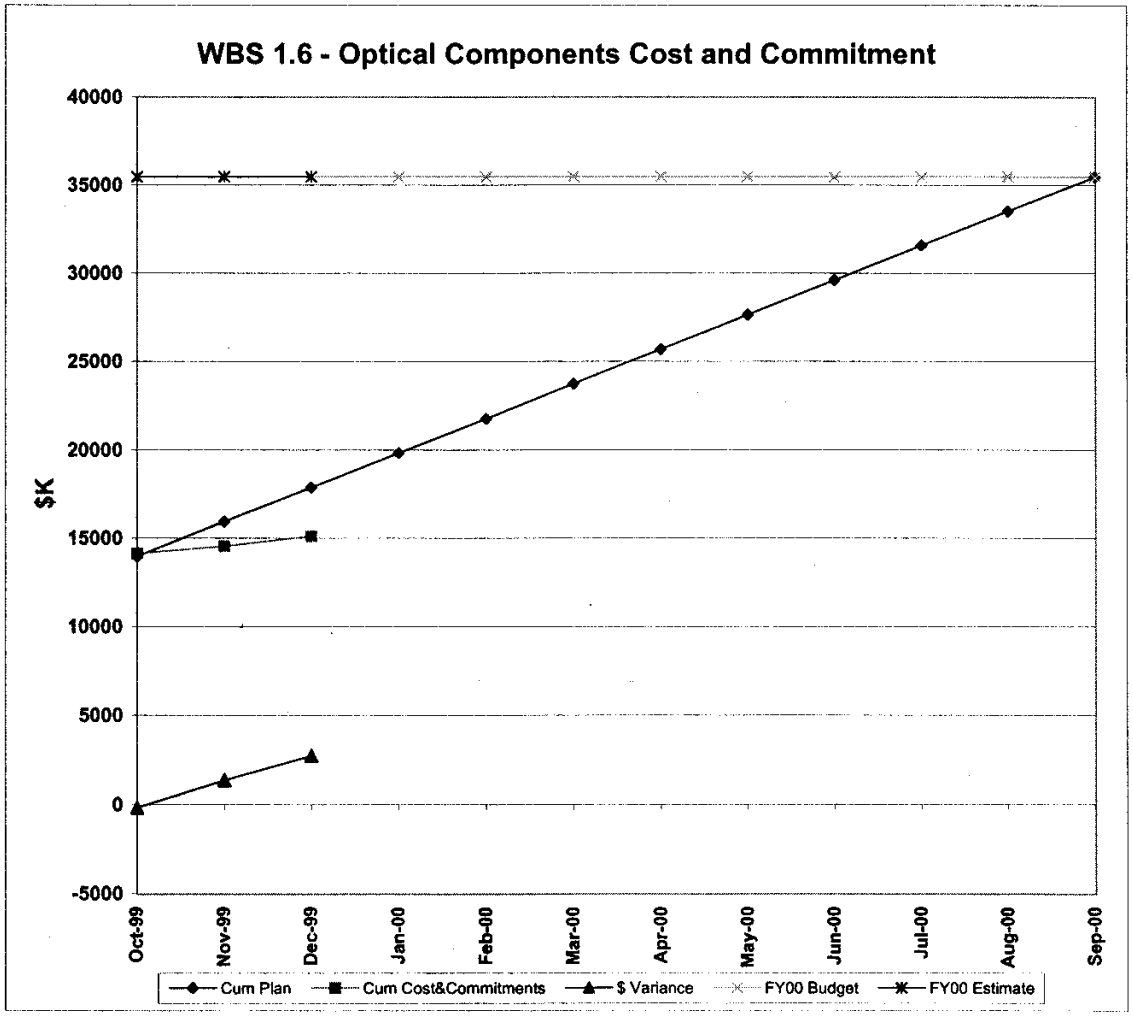
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,681	1,067	1,681	1,067	614	37%	25,798	25,798
Nov-99	2,192	1,704	3,873	2,771	1,102	28%	25,798	25,798
Dec-99	2,193	2,422	6,066	5,193	873	14%	25,798	25,798
Jan-00	2,193		8,258				25,798	
Feb-00	2,193		10,451				25,798	
Mar-00	2,193		12,643				25,798	
Apr-00	2,193		14,836				25,798	
May-00	2,193		17,028				25,798	
Jun-00	2,193		19,221				25,798	
Jul-00	2,193		21,413				25,798	
Aug-00	2,193		23,606				25,798	
Sep-00	2,193		25,798				25,798	



FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.6 - Optical Components ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	13,984 *	14,124	13,984 *	14,124	-140	-1%	35,473	35,473
Nov-99	1,954	441	15,938	14,565	1,373	9%	35,473	35,473
Dec-99	1,954	570	17,891	15,135	2,756	15%	35,473	35,473
Jan-00	1,954		19,845				35,473	
Feb-00	1,954		21,798				35,473	
Mar-00	1,954		23,752				35,473	
Apr-00	1,954		25,705				35,473	
May-00	1,954		27,659				35,473	
Jun-00	1,954		29,612				35,473	
Jul-00	1,954		31,566				35,473	
Aug-00	1,954		33,519				35,473	
Sep-00	1,954		35,473				35,473	

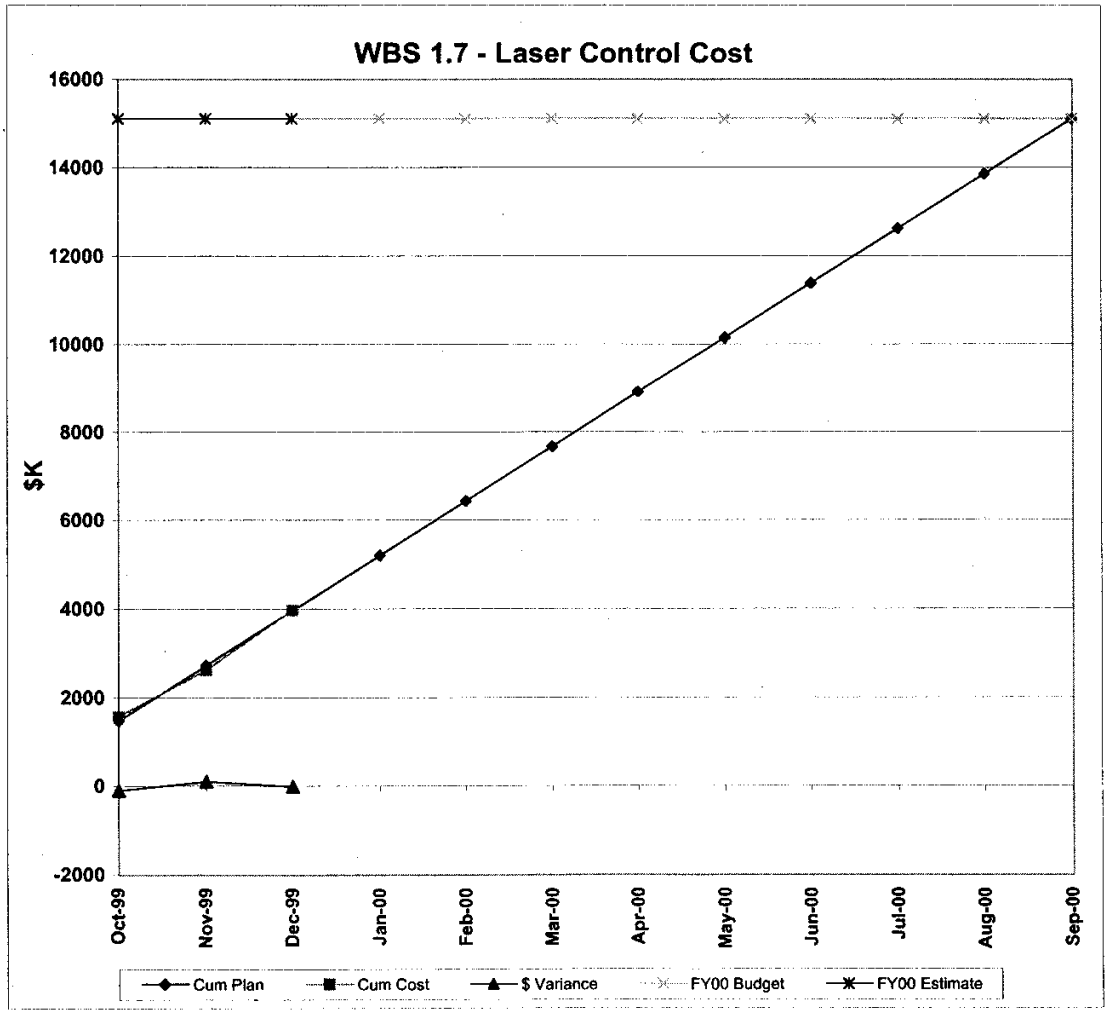


* Includes $12,620K of uncosted obligations from FY99.

FY2000 Cost Plan to Actual as of December 1999
WBS 1.7 - Laser Control ($K)

Project Number 96-D-111
December 1999

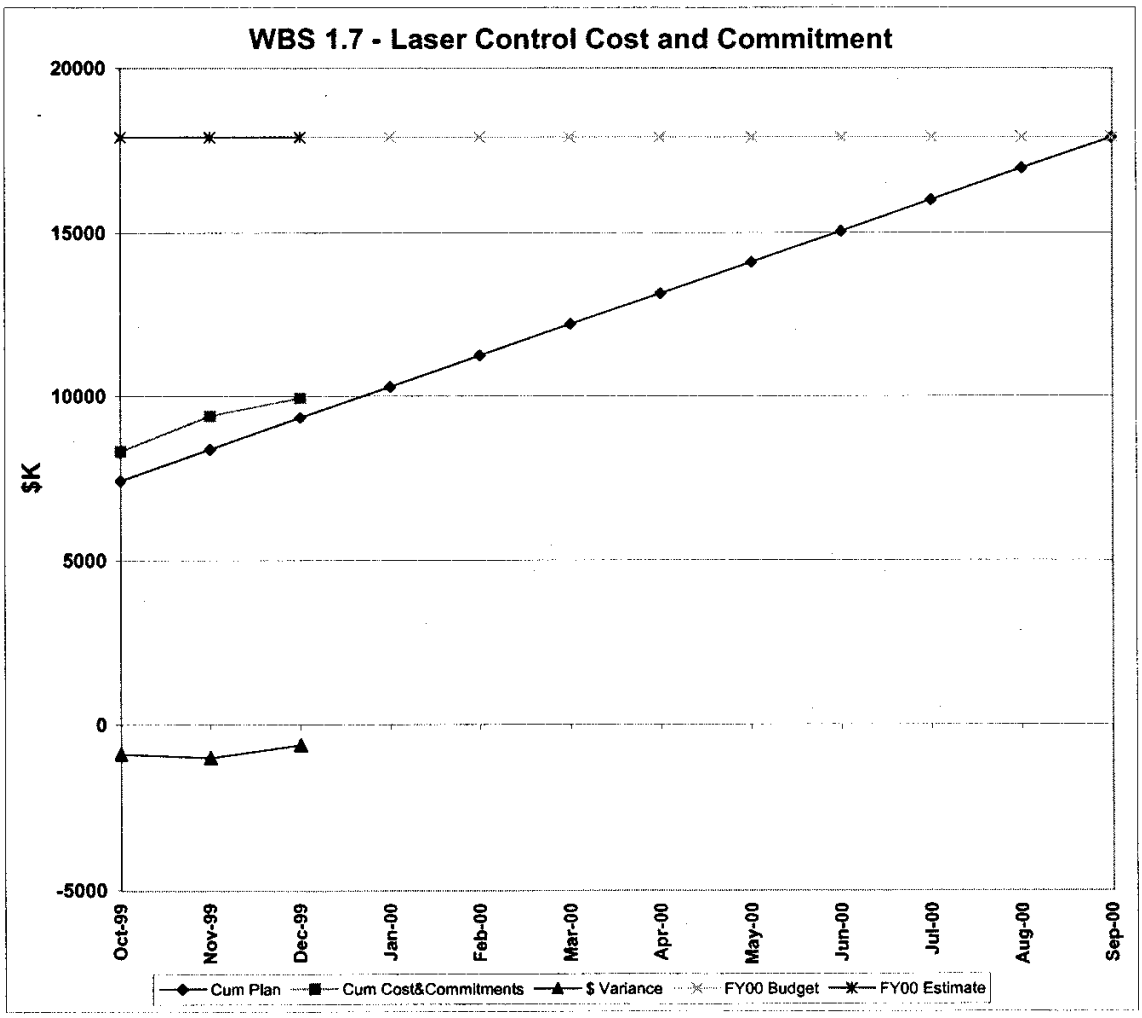
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,483	1,582	1,483	1,582	-99	-7%	15,103	15,103
Nov-99	1,238	1,042	2,721	2,625	97	4%	15,103	15,103
Dec-99	1,238	1,351	3,959	3,976	-17	0%	15,103	15,103
Jan-00	1,238		5,198				15,103	
Feb-00	1,238		6,436				15,103	
Mar-00	1,238		7,674				15,103	
Apr-00	1,238		8,912				15,103	
May-00	1,238		10,150				15,103	
Jun-00	1,238		11,389				15,103	
Jul-00	1,238		12,627				15,103	
Aug-00	1,238		13,865				15,103	
Sep-00	1,238		15,103				15,103	



FY2000 Cost and Commitment Plan to Actual as of December 1999
WBS 1.7 - Laser Control ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	7,429 *	8,309	7,429 *	8,309	-880	-12%	17,914	17,914
Nov-99	953	1,089	8,382	9,398	-1,016	-12%	17,914	17,914
Dec-99	953	544	9,335	9,942	-607	-6%	17,914	17,914
Jan-00	953		10,289				17,914	
Feb-00	953		11,242				17,914	
Mar-00	953		12,195				17,914	
Apr-00	953		13,148				17,914	
May-00	953		14,101				17,914	
Jun-00	953		15,055				17,914	
Jul-00	953		16,008				17,914	
Aug-00	953		16,961				17,914	
Sep-00	953		17,914				17,914	

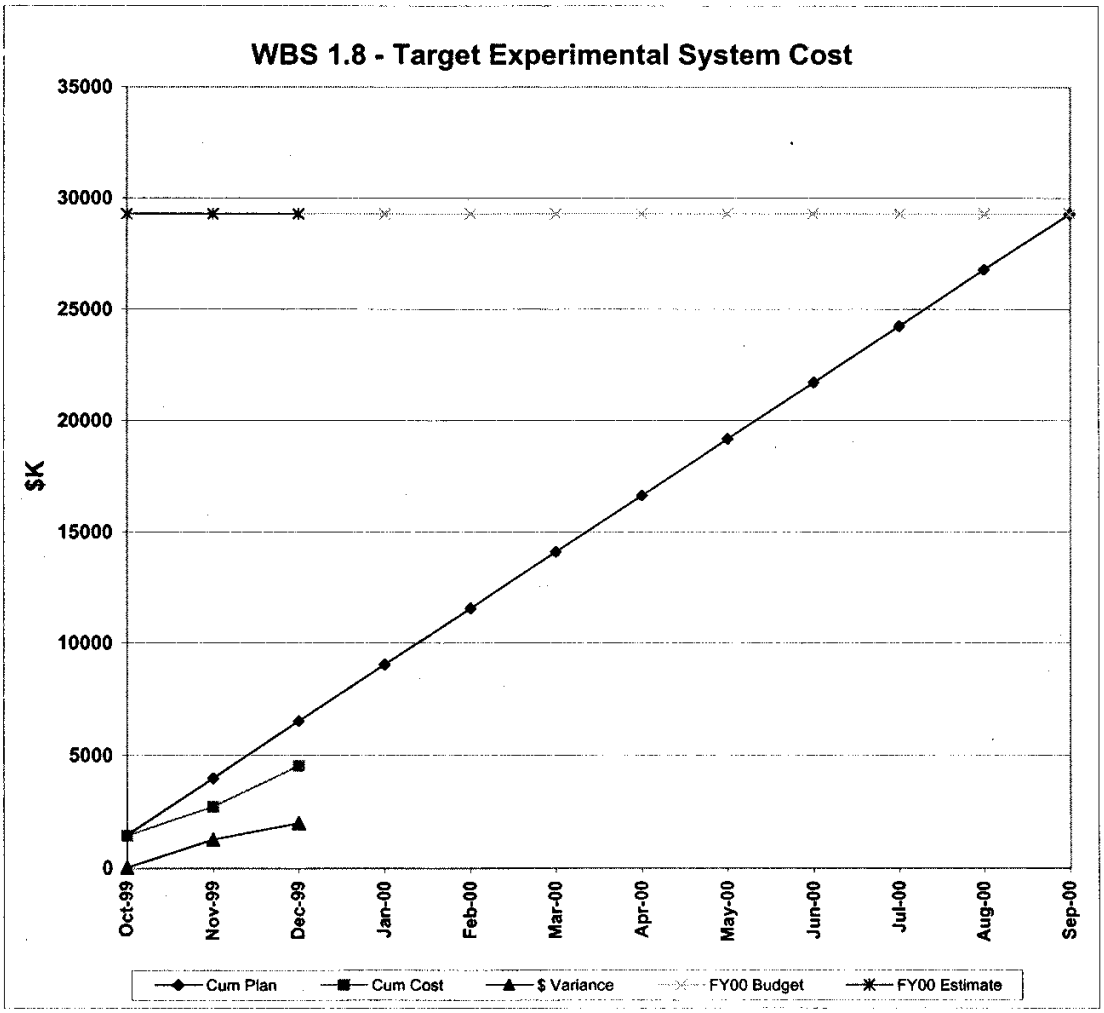


* Includes $4,136K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.8 - Target Experimental System ($K)

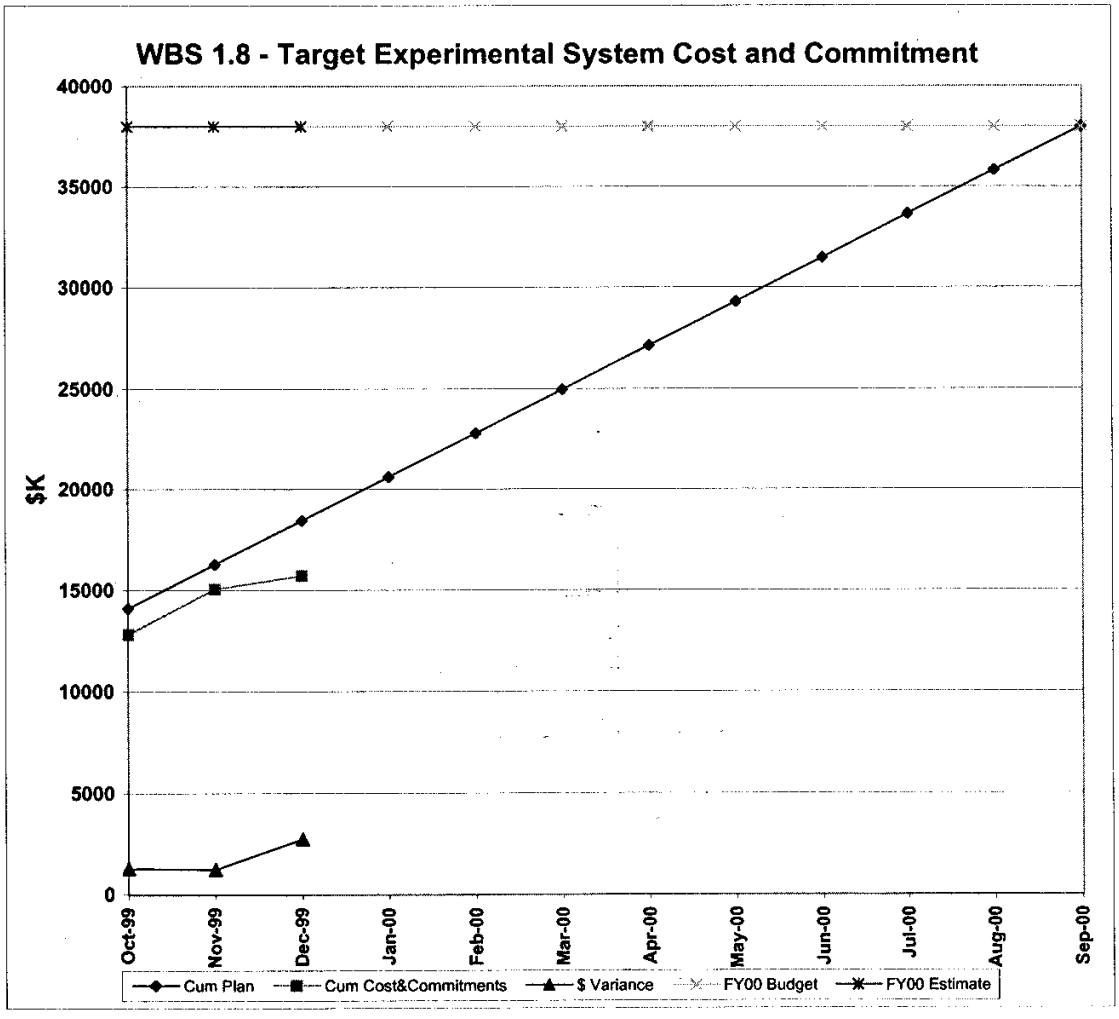
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,458	1,429	1,458	1,429	29	2%	29,303	29,303
Nov-99	2,531	1,296	3,989	2,725	1,264	32%	29,303	29,303
Dec-99	2,531	1,806	6,521	4,531	1,990	31%	29,303	29,303
Jan-00	2,531		9,052				29,303	
Feb-00	2,531		11,584				29,303	
Mar-00	2,531		14,115				29,303	
Apr-00	2,531		16,646				29,303	
May-00	2,531		19,178				29,303	
Jun-00	2,531		21,709				29,303	
Jul-00	2,531		24,241				29,303	
Aug-00	2,531		26,772				29,303	
Sep-00	2,531		29,303				29,303	



FY2000 Cost and Commitment Plan to Actual as of December 1999
WBS 1.8 - Target Experimental System ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	14,093 *	12,805	14,093 *	12,805	1,288	9%	38,008	38,008
Nov-99	2,174	2,246	16,267	15,050	1,217	7%	38,008	38,008
Dec-99	2,174	670	18,441	15,720	2,721	15%	38,008	38,008
Jan-00	2,174		20,615				38,008	
Feb-00	2,174		22,789				38,008	
Mar-00	2,174		24,964				38,008	
Apr-00	2,174		27,138				38,008	
May-00	2,174		29,312				38,008	
Jun-00	2,174		31,486				38,008	
Jul-00	2,174		33,660				38,008	
Aug-00	2,174		35,834				38,008	
Sep-00	2,174		38,008				38,008	

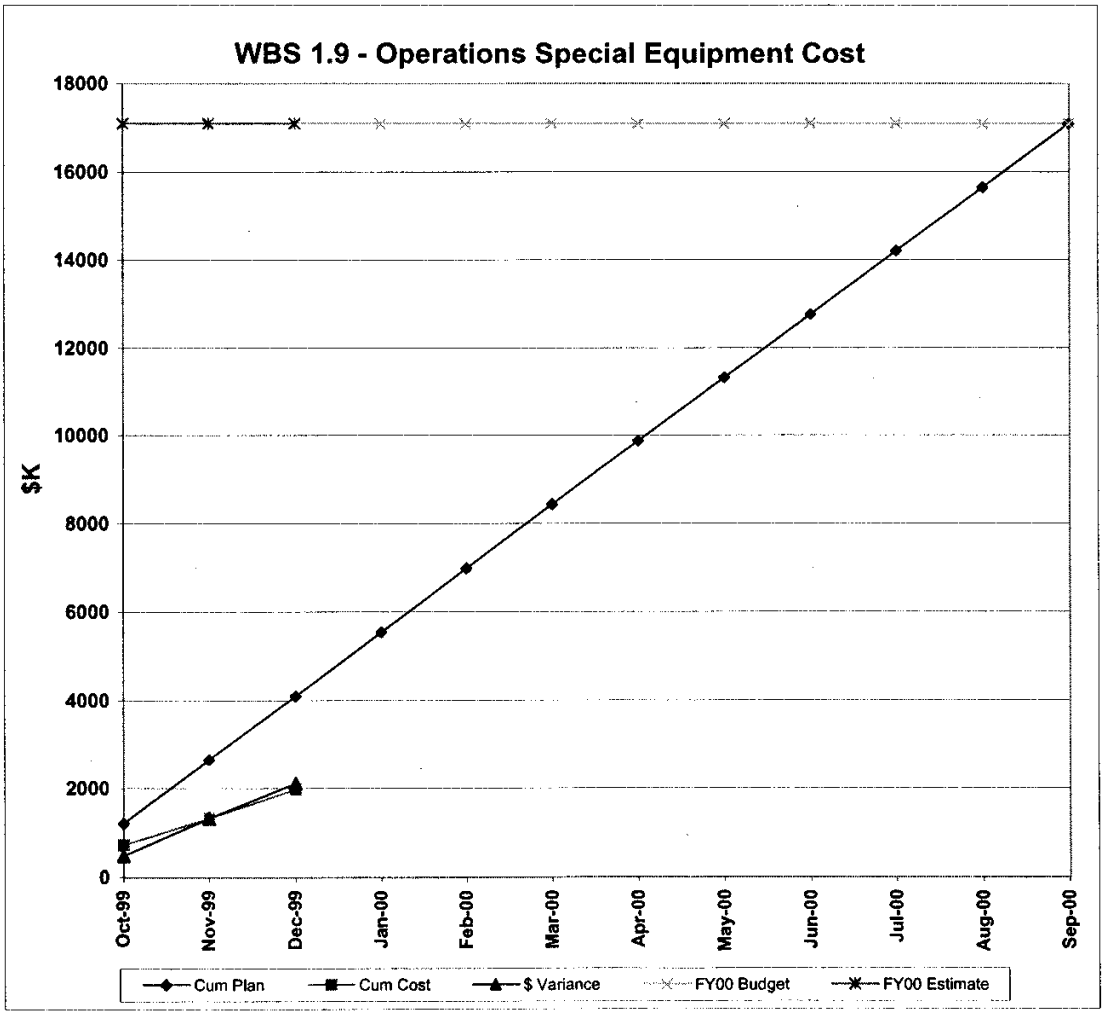


* Includes $6,252K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.9 - Operations Special Equipment ($K)

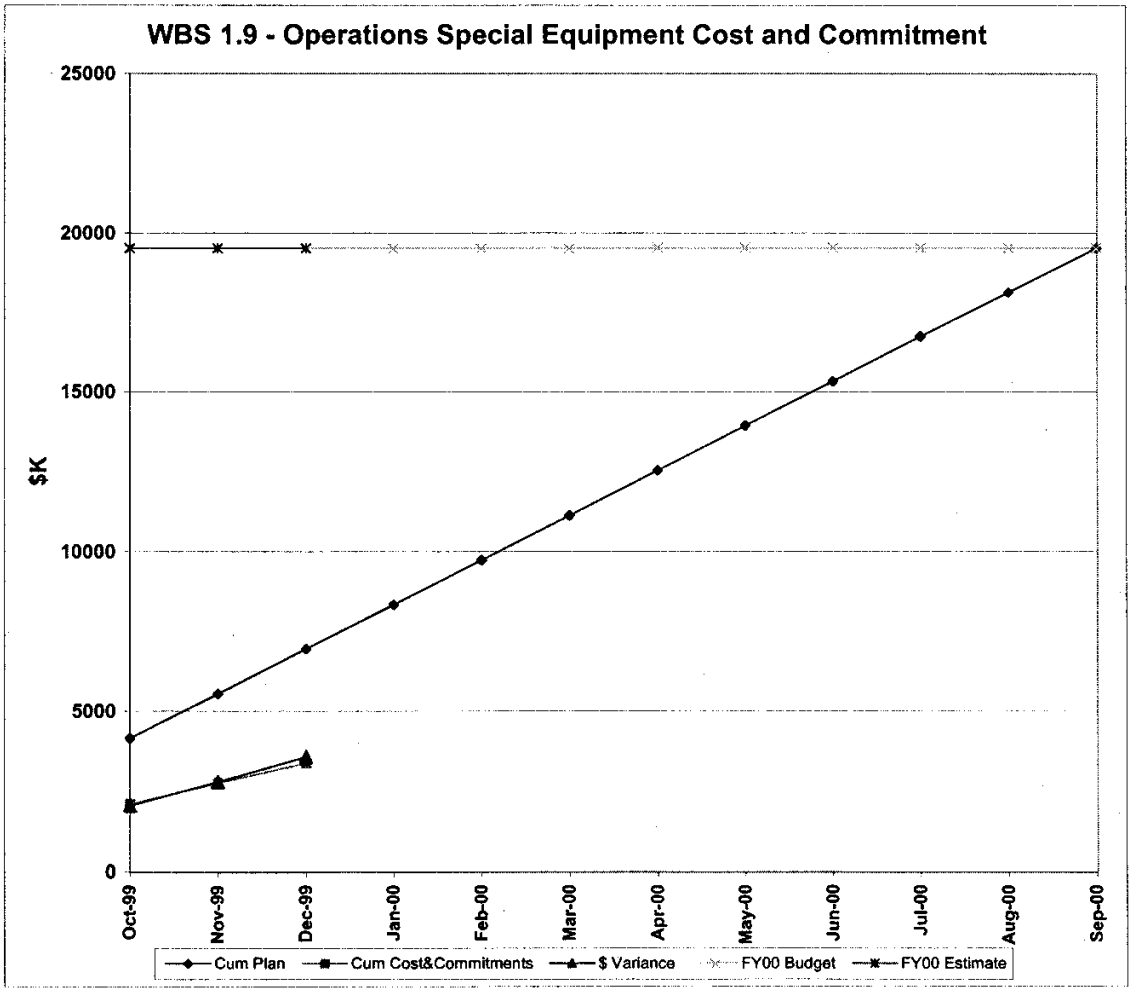
	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,209	728	1,209	728	481	40%	17,091	17,091
Nov-99	1,444	601	2,653	1,329	1,324	50%	17,091	17,091
Dec-99	1,444	653	4,097	1,982	2,115	52%	17,091	17,091
Jan-00	1,444		5,540				17,091	
Feb-00	1,444		6,984				17,091	
Mar-00	1,444		8,428				17,091	
Apr-00	1,444		9,872				17,091	
May-00	1,444		11,316				17,091	
Jun-00	1,444		12,759				17,091	
Jul-00	1,444		14,203				17,091	
Aug-00	1,444		15,647				17,091	
Sep-00	1,444		17,091				17,091	



Project Number 96-D-111
December 1999

FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.9 - Operations
Special Equipment ($K)

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	4,144 *	2,102	4,144 *	2,102	2,042	49%	19,537	19,537
Nov-99	1,399	657	5,543	2,759	2,784	50%	19,537	19,537
Dec-99	1,399	618	6,943	3,377	3,566	51%	19,537	19,537
Jan-00	1,399		8,342				19,537	
Feb-00	1,399		9,742				19,537	
Mar-00	1,399		11,141				19,537	
Apr-00	1,399		12,540				19,537	
May-00	1,399		13,940				19,537	
Jun-00	1,399		15,339				19,537	
Jul-00	1,399		16,739				19,537	
Aug-00	1,399		18,138				19,537	
Sep-00	1,399		19,537				19,537	

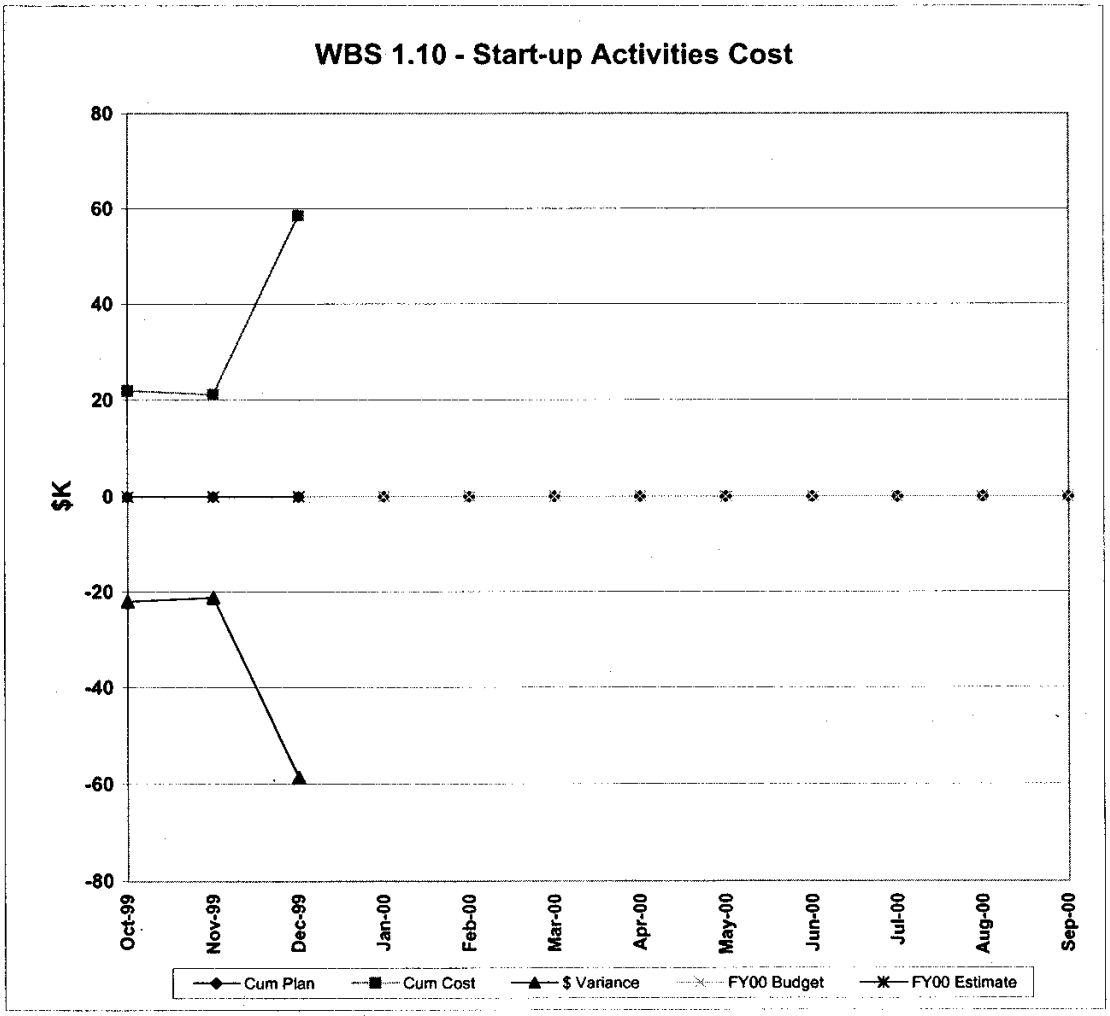


* Includes $1,404K of uncosted obligations from FY99.

Project Number 96-D-111
December 1999

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.10 - Start-up Activities ($K)

	Monthly		Cumulative				FY2000	FY2000
Month	Planned*	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-99	0	22	0	22	-22	#DIV/0!	0	0
Nov-99	0	-1	0	21	-21	#DIV/0!	0	0
Dec-99	0	37	0	59	-59	#DIV/0!	0	
Jan-00	0		0				0	
Feb-00	0		0				0	
Mar-00	0		0				0	
Apr-00	0		0				0	
May-00	0		0				0	
Jun-00	0		0				0	
Jul-00	0		0				0	
Aug-00	0		0				0	
Sep-00	0		0				0	

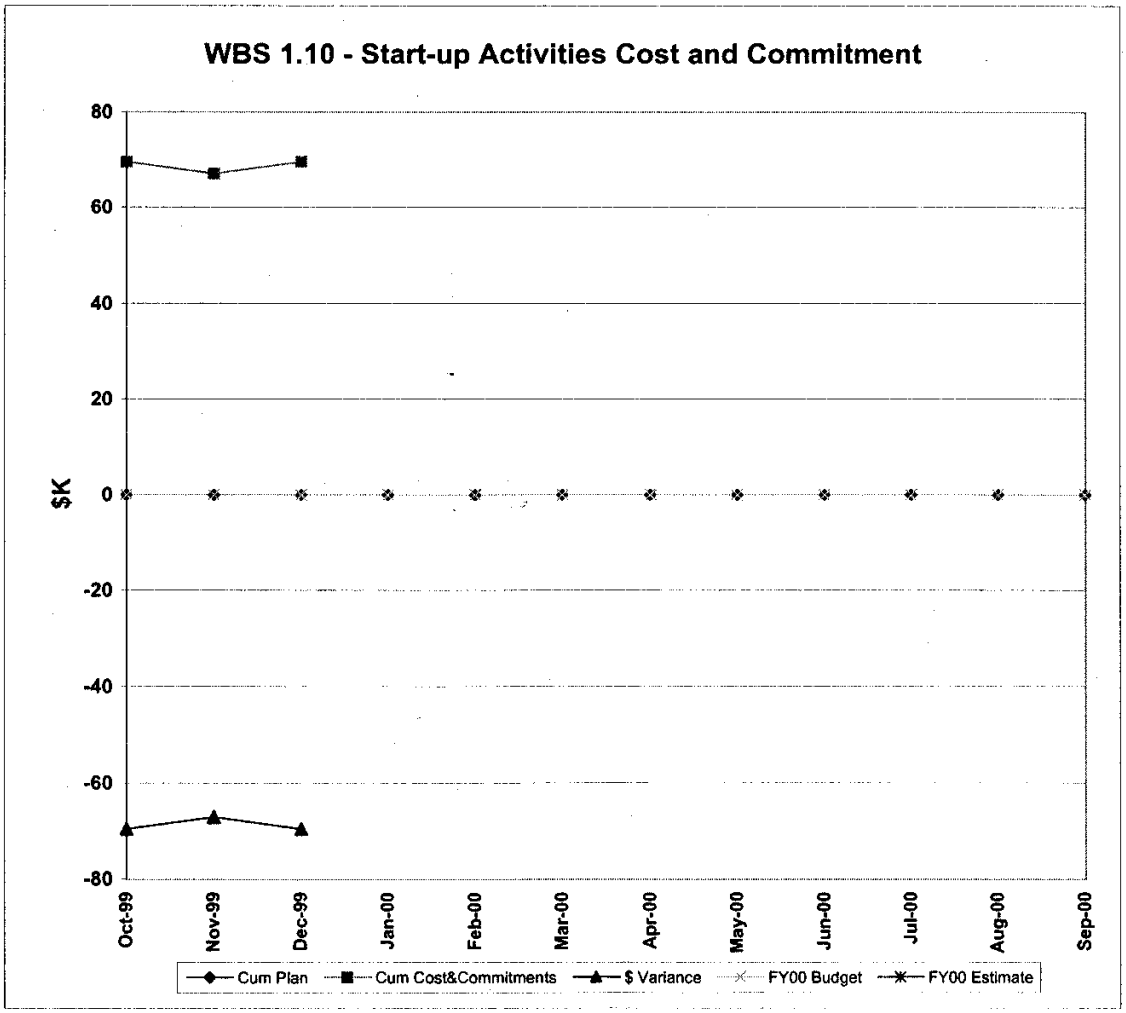


* Plan will be prepared and budgeted.

FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.10 - Start-up Activities ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned*	Actual	Planned	Actual	$ Var	% Var	Budget*	Estimate
Oct-99	0	70	0	70	-70	#DIV/0!	0	0
Nov-99	0	-2	0	67	-67	#DIV/0!	0	0
Dec-99	0	3	0	70	-70	#DIV/0!	0	0
Jan-00	0		0				0	
Feb-00	0		0				0	
Mar-00	0		0				0	
Apr-00	0		0				0	
May-00	0		0				0	
Jun-00	0		0				0	
Jul-00	0		0				0	
Aug-00	0		0				0	
Sep-00	0		0				0	

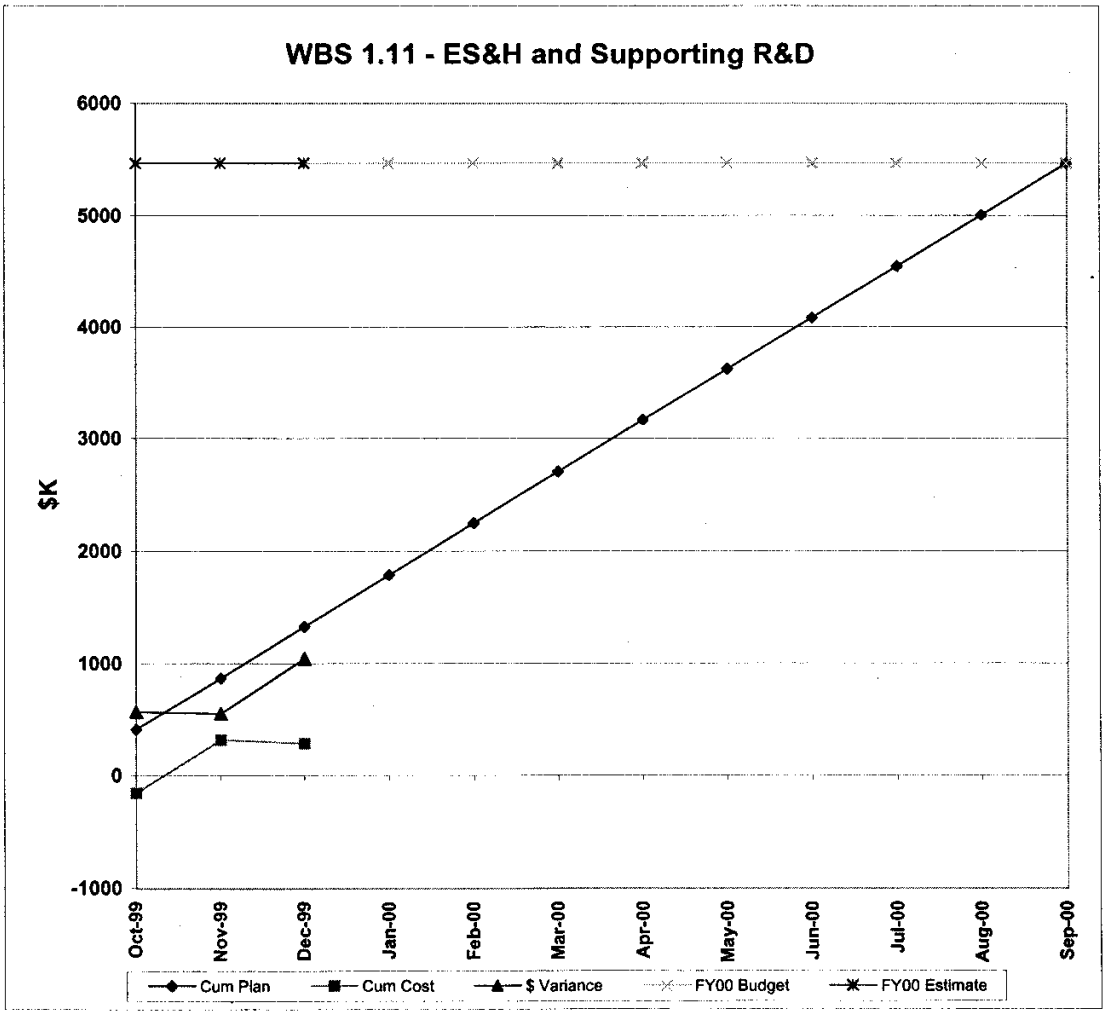


* Plan will be prepared and budgeted.

FY2000 Cost Plan to Actual
as of December 1999
WBS 1.11 ($K)

Project Number 96-D-111
December 1999

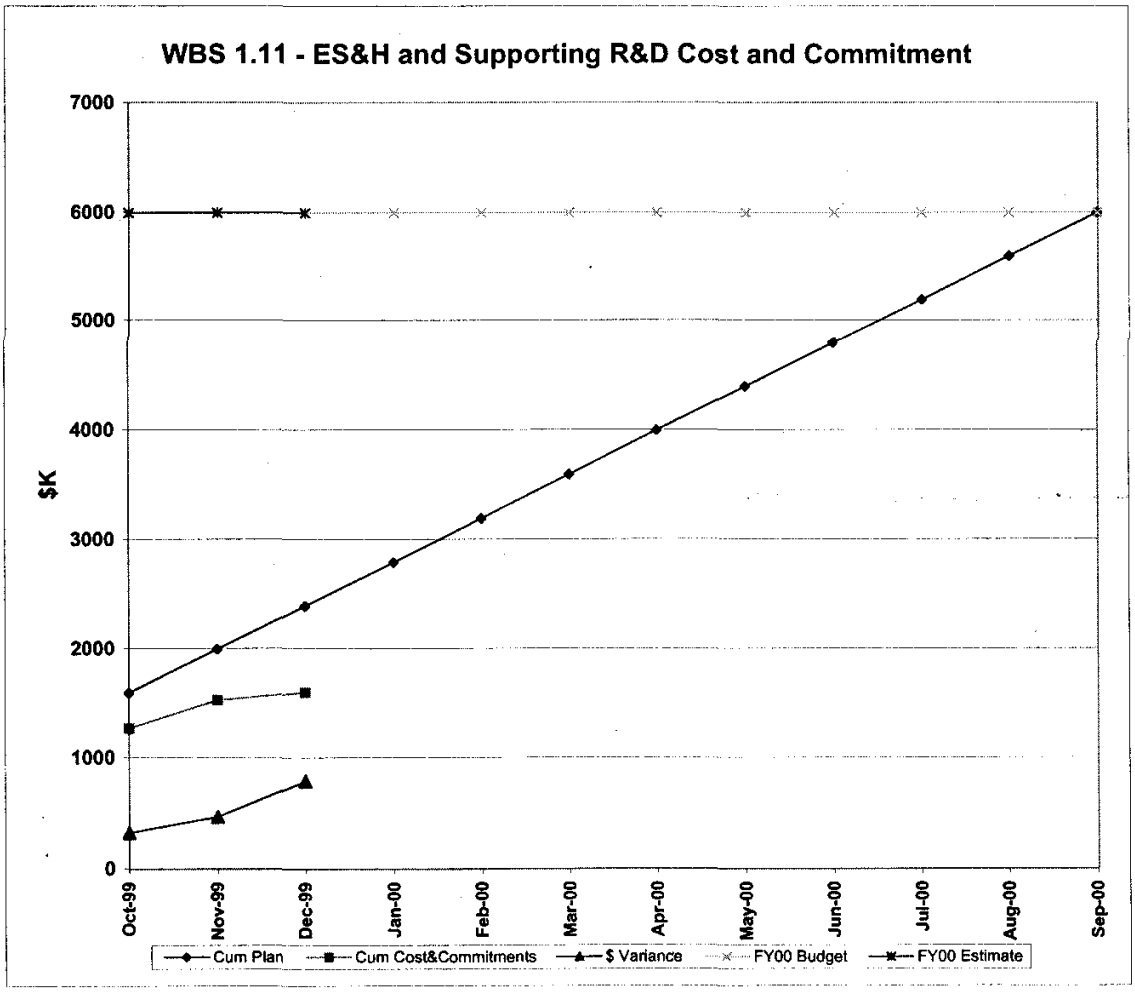
Monthly			Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	410	-157	410	-157	567	138%	5,466	5,466
Nov-99	460	474	870	317	553	64%	5,466	5,466
Dec-99	460	-33	1,329	284	1,046	79%	5,466	5,466
Jan-00	460		1,789				5,466	
Feb-00	460		2,248				5,466	
Mar-00	460		2,708				5,466	
Apr-00	460		3,168				5,466	
May-00	460		3,627				5,466	
Jun-00	460		4,087				5,466	
Jul-00	460		4,546				5,466	
Aug-00	460		5,006				5,466	
Sep-00	460		5,466				5,466	



FY2000 Cost and Commitment Plan to Actual
as of December 1999
WBS 1.11 ($K)

Project Number 96-D-111
December 1999

	Monthly		Cumulative				FY2000	FY2000
Month	Planned	Actual	Planned	Actual	$ Var	% Var	Budget	Estimate
Oct-99	1,592 *	1,269	1,592 *	1,269	323	20%	5,993	5,993
Nov-99	400	256	1,992	1,525	467	23%	5,993	5,993
Dec-99	400	73	2,392	1,598	794	33%	5,993	5,993
Jan-00	400		2,792				5,993	
Feb-00	400		3,192				5,993	
Mar-00	400		3,593				5,993	
Apr-00	400		3,993				5,993	
May-00	400		4,393				5,993	
Jun-00	400		4,793				5,993	
Jul-00	400		5,193				5,993	
Aug-00	400		5,593				5,993	
Sep-00	400		5,993				5,993	



* includes $1,423K of uncosted obligations from FY99.

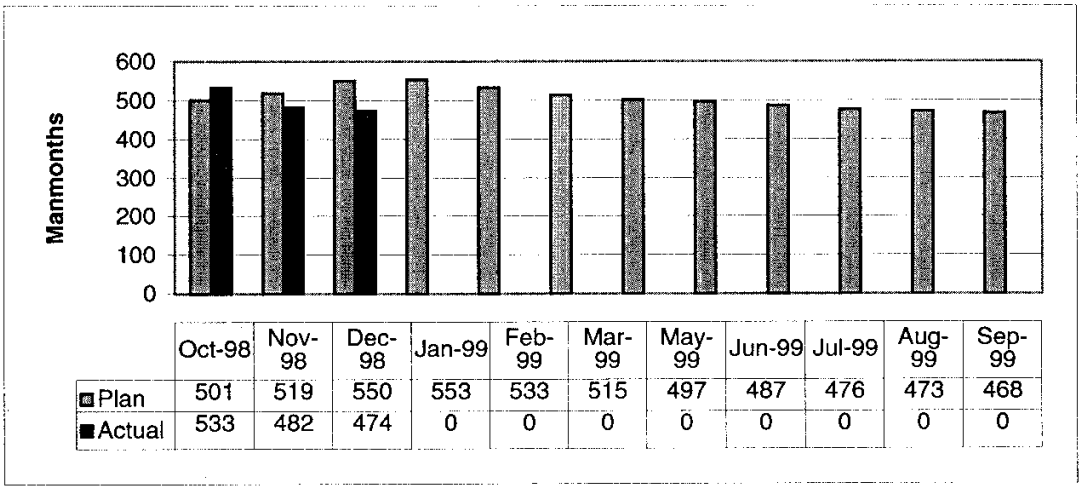
1Q00 Contingency Log

Month	Request #	WBS element	Total	Contingency*
Oct-99	BCP00-002	1.2.2.1	$ 725,200	$ 29,948,388
	CTR319	1.8.7	$ 65,000	$ 29,883,388
	CTR323	1.2.2.4.9	$ 185,000	$ 29,698,388
	ECR1072	1.4.1	$ 26,800	$ 29,671,588
	ECR1120	1.4.1.3	$ 28,800	$ 29,642,788
		1.4.3.2	$ 67,200	$ 29,575,588
	ECR1124	1.3.2.6	$ 3,700	$ 29,571,888
	ECR410	1.4.1.2	$ 468,000	$ 29,103,888
		1.4.4.1	$ (683,200)	$ 29,787,088
Nov-99	BCP00-005	1.3.4	$ (1,812,000)	$ 31,599,088
	BCP00-007	1.2.2.1	$ 100,000	$ 31,499,088
		1.2.2.4.9	$ 1,200,000	$ 30,299,088
	BCP00-008	1.3.2	$ 846,000	$ 29,453,088
	BCP00-009	1.3.2	$ 2,389,600	$ 27,063,488
	CTR324	1.2.2.4.6	$ 100,000	$ 26,963,488
	CTR325	1.2.2.4.4	$ 76,000	$ 26,887,488
	CTR327	1.3.2	$ 195,000	$ 26,692,488
	CTR328	1.2.2.4.6	$ 118,000	$ 26,574,488
	CTR330	1.4.3.1	$ 375,000	$ 26,199,488
	CTR331	1.2.2.4.9	$ 198,000	$ 26,001,488
	ECR1166	1.9.2	$ 5,000	$ 25,996,488
Dec-99	BCP00-010	1.4.5.1	$ 800,000	$ 25,196,488
	CTR332	1.2.2.4.9	$ 250,000	$ 24,946,488
	CTR336	1.2.2.4.6	$ 156,000	$ 24,790,488
	CTR338	1.2.2.4.5	$ 108,000	$ 24,682,488
	CTR340	1.2.2.4.6	$ 133,000	$ 24,549,488
	ECR1275	1.4.4	$ 250,000	$ 24,299,488
		1.8.4	$ 250,000	$ 24,049,488

* Remainining Contingency as a % of cost remaining will be reported when the rebaselining is complete and revised BAC/EAC is established and approved.

1Q00 - Manpower Plan to Actual

1Q00 NIF Manpower - Plan to Actual by Month*
(LLNL and Supplemental Labor Manmonths)



	Oct-98	Nov-98	Dec-98	Jan-99	Feb-99	Mar-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99
Plan	501	519	550	553	533	515	497	487	476	473	468
Actual	533	482	474	0	0	0	0	0	0	0	0

* FY00 manpower plan will be in draft until the rebaselining effort is complete and FY00 Cost Account Plans are approved.